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UK METEOROLOGICAL OFFICE GLOBAL DATA MONITORING REPORT

March 2002

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CONTENTS

1. Introduction

2. Global Data Monitoring Statistics

3. Composite Observing Systems for the North Atlantic (COSNA)

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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background field). Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1and 2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or sea surface temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. Only data from the main hours of 00 UTC, 06 UTC, 12UTC and 18 UTC are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At the UK Met. Office, we monitor SYNOP pressure after it has been interpolated to our Global NWP Model's surface height. For most synoptic stations (about 75%), the surface pressure (at the model surface) is calculated from the reported station-level pressure, or, if this is not available, the height of a standard pressure-level (e.g. 850 hPa or 700 hPa). If neither of these are available, or if the reported station-level pressure is deemed unreliable, the reported mean sea-level pressure is used (about 25% of SYNOPs).

Aircraft observations

Tables 4A (300-150 hPa) and 4B (1000-301 hPa) contain lists of statistics calculated from data received from all airline carriers.

Figures 3A (300-150 hPa) and 3B (1000-301 hPa) show 10 degree lat/long box average numbers of aircraft reports in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS) received per day throughout the month at Bracknell and assimilated into model runs. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4A-7A (300-150 hPa) and 4B-7B (1000-301 hPa) show wind statistics for AIREP/ASDAR in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS). Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.
N.B. The sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

Figure		Weighting function peak (hPa)
26	Mean	Surface (HIRS8)
27	SD	Surface (HIRS8)
28	Mean	700 (HIRS15)
29	SD	700 (HIRS15)
30	Mean	500-700 (HIRS11)
31	SD	500-700 (HIRS11)
32	Mean	400 (HIRS4)
33	SD	400 (HIRS4)
34	Mean	700 (AMSUA5)
35	SD	700 (AMSUA5)
36	Mean	300 (AMSUA7)
37	SD	300 (AMSUA7)
38	Mean	100 (AMSUA9)
39	RMS	100 (AMSUA9)

Figures 40-54 show sounding statistics from the polar orbitting satellite NOAA-16. Figure 40 shows the mean daily number of ATOVS soundings, and figures 41-54 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.
N.B. The sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

Figure		Weighting function peak (hPa)
41	Mean	Surface (HIRS8)
42	SD	Surface (HIRS8)
43	Mean	700 (HIRS15)
44	SD	700 (HIRS15)
45	Mean	500-700 (HIRS11)
46	SD	500-700 (HIRS11)
47	Mean	400 (HIRS4)
48	SD	400 (HIRS4)
49	Mean	700 (AMSUA5)
50	SD	700 (AMSUA5)
51	Mean	300 (AMSUA7)
52	SD	300 (AMSUA7)
53	Mean	100 (AMSUA9)
54	RMS	100 (AMSUA9)

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics **(Geopotential Height and Windspeed at 100 and 500 hPa)** for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.
17. September 1999. Included statistics for high resolution visible winds from Meteosat-5 and Meteosat-7.
18. October 1999. The 3-D VAR assimilation system was upgraded on 19 October, including improvements in the assimilation of ATOVS radiances, use of SSM/I surface wind speed, an improvement in the calculation of surface pressure for SYNOPs, and thinning and revision of observation errors of aircraft data.
19. November 1999. High resolution visible winds from Meteosat-5 and Meteosat-7 removed until used operationally.
20. April 2000. Aireps in Table 4 and Figures 3-7 split into ranges 300-150 hPa (A) and 1000-301 hPa (B).
21. September 2000. Corrected an error affecting the mean positions of a minority of buoys in Table 2.
22. November 2000. An error in the production of Table 6 was corrected. Previously, some sondes with suspect vector winds were being missed.
23. April 2001. Included statistics for ATOVS sounding data from NOAA-16.
24. May 2001. Included statistics for sea surface temperatures from marine surface observations.

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: March 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from UKMO global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored
:Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (Degrees).
:Sea surface temperature (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the wind observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT
:15 hPa (pressure)
:25 m s^{-1} (vector wind)
:10 degrees (sea surface temperature)

SELECTION CRITERIA :NOBS ≥ 20 , and one or more of the following:

1.|bias|
≥ 4 hPa (pressure),
≥ 5 m s^{-1} (wind speed),
≥ 30 degrees (direction).
≥ 3 degrees (sea surface temperature).

2.SD
≥ 6 hPa (pressure),
≥ 80 degrees (direction).
≥ 5 degrees (sea surface temperature).

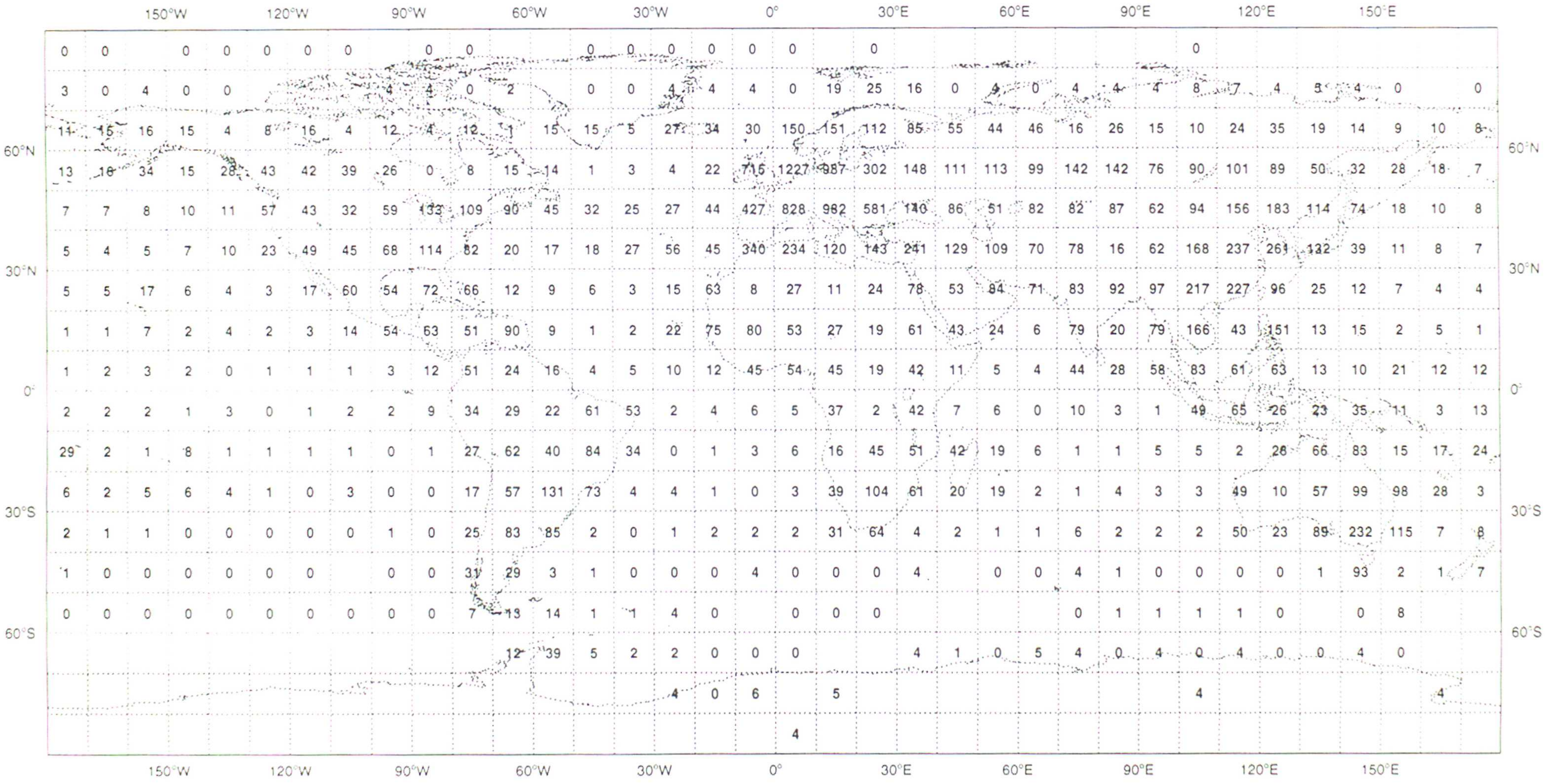
3.PGE ≥ 25

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
C6FE6	ALL	P	SUR	25	0	0	1.9	6.9	7.2
C6FM7	ALL	P	SUR	28	0	0	2.7	-5.6	6.2
C6QK	ALL	P	SUR	24	0	0	1.5	6.6	6.8
C6QY4	ALL	P	SUR	21	0	0	1.8	-4.3	4.7
ELXZ7	ALL	P	SUR	37	0	0	0.9	-4.3	4.4
ELZF7	ALL	P	SUR	22	0	0	0.7	4.9	4.9
H9PD	ALL	P	SUR	28	0	0	1.6	-5.9	6.2
MVLA7	ALL	P	SUR	34	0	0	2.9	6.1	6.8
P3CE9	ALL	P	SUR	25	0	0	7.0	3.7	7.9
UCJP	ALL	P	SUR	68	0	0	2.0	4.5	4.9
UCUE	ALL	P	SUR	36	3	8	3.9	-4.9	6.3
UDYG	ALL	P	SUR	96	1	1	4.3	-4.1	5.9
UFNO	ALL	P	SUR	23	0	0	1.0	6.7	6.7
UGGA	ALL	P	SUR	59	0	0	3.2	-6.0	6.8
UGWB	ALL	P	SUR	22	0	0	3.7	9.0	9.8
UHLE	ALL	P	SUR	36	0	0	1.9	-9.1	9.3
VGDX	ALL	P	SUR	24	0	0	2.6	-4.2	5.0
VGFQ	ALL	P	SUR	53	13	25	5.5	-5.7	7.9
VVMA	ALL	P	SUR	39	0	0	2.2	5.7	6.1
V2PR	ALL	P	SUR	25	0	0	1.4	-4.2	4.4
V7BW9	ALL	P	SUR	49	1	2	2.2	-5.2	5.6
WCY2920	ALL	P	SUR	50	0	0	3.2	6.0	6.8
WRYE	ALL	P	SUR	61	0	0	1.5	-4.7	4.9
62114	ALL	P	SUR	59	0	0	4.1	-4.2	5.8
62151	ALL	P	SUR	27	1	4	3.6	8.0	8.8
8PNI	ALL	P	SUR	31	0	0	1.3	-4.4	4.5
WIND SPEED									
DZSE	ALL	SPEED	SUR	39	0	0	2.5	7.2	7.7
ELXS8	ALL	SPEED	SUR	30	1	3	5.5	5.2	7.6
ELXT8	ALL	SPEED	SUR	20	0	0	5.4	11.5	12.7
ELXU5	ALL	SPEED	SUR	43	0	0	2.9	5.3	6.0
MWRA9	ALL	SPEED	SUR	20	0	0	4.9	7.5	8.9
OWFU2	ALL	SPEED	SUR	35	1	3	3.8	5.2	6.5
OWVI2	ALL	SPEED	SUR	27	1	4	3.8	10.0	10.7
SXYY	ALL	SPEED	SUR	27	1	4	5.6	9.1	10.7
UCTJ	ALL	SPEED	SUR	24	0	0	2.7	5.7	6.3
VLST	ALL	SPEED	SUR	195	0	0	2.5	5.0	5.6
V2FA2	ALL	SPEED	SUR	59	0	0	2.2	5.0	5.4
V2FN	ALL	SPEED	SUR	25	1	4	5.6	12.5	13.7
V7AV6	ALL	SPEED	SUR	70	0	0	3.1	-5.8	6.6
WRYG	ALL	SPEED	SUR	58	0	0	4.0	5.2	6.5
ZCFL	ALL	SPEED	SUR	63	0	0	5.2	5.0	7.2
44145	ALL	SPEED	SUR	229	0	0	4.2	5.2	6.7
WIND DIRECTION									
BBXX KS0	ALL	DIRN.	SUR	83	3	4	95.0	62.2	113.6
ELTQ6	ALL	DIRN.	SUR	47	0	0	34.4	-37.2	50.6
KS005	ALL	DIRN.	SUR	22	0	0	55.3	43.6	70.4
KS012	ALL	DIRN.	SUR	57	3	5	108.4	72.6	130.5
LAMV4	ALL	DIRN.	SUR	26	0	0	83.2	-2.0	83.2
43001	ALL	DIRN.	SUR	87	0	0	13.4	37.8	40.1
46061	ALL	DIRN.	SUR	647	0	0	29.1	-38.3	48.1
52007	ALL	DIRN.	SUR	25	0	0	39.1	-66.8	77.4
62106	ALL	DIRN.	SUR	250	30	12	36.2	96.8	103.4
62131	ALL	DIRN.	SUR	66	0	0	10.2	31.7	33.3

IDENTIFIER	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
SEA SURFACE TEMPERATURE									
BBXX	ALL	SST	SUR	60	19	32	1.2	-1.5	2.0
CGDS	ALL	SST	SUR	83	40	48	1.6	0.6	1.7
CG2960	ALL	SST	SUR	292	74	25	0.9	0.5	1.1
C6MS4	ALL	SST	SUR	43	0	0	1.8	-3.8	4.2
C6MX4	ALL	SST	SUR	25	0	0	0.8	5.9	6.0
DBBX	ALL	SST	SUR	648	346	53	0.7	0.2	0.8
DINK	ALL	SST	SUR	53	52	98	0.0	-0.2	0.2
ELJQ2	ALL	SST	SUR	24	0	0	1.6	3.9	4.2
ELOG5	ALL	SST	SUR	20	0	0	1.7	4.8	5.1
ELYE8	ALL	SST	SUR	57	0	0	1.1	3.2	3.4
FNVA	ALL	SST	SUR	104	22	21	0.3	9.6	9.6
H9FU	ALL	SST	SUR	35	22	63	1.2	-1.4	1.8
H9IL	ALL	SST	SUR	21	0	0	1.2	3.2	3.4
H9IM	ALL	SST	SUR	37	0	0	1.1	3.1	3.2
H9RS	ALL	SST	SUR	49	0	0	0.7	3.0	3.1
JADY	ALL	SST	SUR	69	0	0	0.9	5.4	5.5
KGJX	ALL	SST	SUR	56	1	2	1.6	3.1	3.5
KS005	ALL	SST	SUR	48	0	0	0.3	-8.6	8.6
NRUO	ALL	SST	SUR	61	13	21	3.4	3.3	4.7
PDYI	ALL	SST	SUR	35	0	0	0.8	-3.5	3.6
PDYV	ALL	SST	SUR	70	0	0	0.8	-3.2	3.3
PJOX	ALL	SST	SUR	55	0	0	1.5	-4.0	4.2
P3BA7	ALL	SST	SUR	21	0	0	3.7	-3.5	5.1
P3CE9	ALL	SST	SUR	25	0	0	2.5	-4.0	4.7
P3FY6	ALL	SST	SUR	36	0	0	0.9	4.4	4.5
SHIPEU	ALL	SST	SUR	49	15	31	1.8	0.4	1.8
TSMS	ALL	SST	SUR	77	0	0	0.9	-4.0	4.1
UCUP	ALL	SST	SUR	31	1	3	1.4	-4.3	4.5
UHRS	ALL	SST	SUR	27	0	0	2.0	3.5	4.0
VCLM	ALL	SST	SUR	542	388	72	2.1	2.0	2.9
VGLZ	ALL	SST	SUR	33	33	100			
VOCJ	ALL	SST	SUR	148	26	18	2.0	3.6	4.1
VRRB	ALL	SST	SUR	62	0	0	2.2	-3.5	4.2
V7AV6	ALL	SST	SUR	76	9	12	1.4	-3.5	3.8
WZJD	ALL	SST	SUR	27	0	0	1.6	-3.3	3.7
YJQL3	ALL	SST	SUR	34	0	0	0.9	-5.2	5.2
3ECM7	ALL	SST	SUR	141	0	0	1.2	3.4	3.7
3FAK5	ALL	SST	SUR	32	12	38	0.6	0.8	1.0
3FDZ5	ALL	SST	SUR	40	0	0	1.7	4.9	5.2
3FHX8	ALL	SST	SUR	21	1	5	2.4	-3.7	4.4
3FQO4	ALL	SST	SUR	25	14	56	3.8	0.7	3.9
44004	ALL	SST	SUR	738	0	0	2.2	-3.2	3.9
46131	ALL	SST	SUR	467	467	100			
46146	ALL	SST	SUR	739	739	100			
46181	ALL	SST	SUR	737	737	100			
9HQK6	ALL	SST	SUR	61	4	7	2.0	-4.6	5.0
9VBL	ALL	SST	SUR	630	244	39	1.4	0.0	1.4

Figure 1. SHIP/SYNOP mean daily count. MARCH 2002
Main hours only
Global average number of observations in 24 hours = 20924



0	0		0	0	0	0	0		0	0			0	0	0	0	0	0		0								0							
3	0	4	0	0				4	4	0	2		0	0	4	4	4	0	19	25	16	0	4	0	4	4	4	8	7	4	5	4	0		0
11	15	16	15	4	8	16	4	12	4	12	1	15	15	5	27	34	30	150	151	112	85	55	44	46	16	26	15	10	24	35	19	14	9	10	8
13	16	34	15	28	43	42	39	26	0	8	15	14	1	3	4	22	715	1227	987	302	148	111	113	99	142	142	76	90	101	89	50	32	28	18	7
7	7	8	10	11	57	43	32	59	133	109	90	45	32	25	27	44	427	828	982	581	140	86	51	82	82	87	62	94	156	183	114	74	18	10	8
5	4	5	7	10	23	49	45	68	114	82	20	17	18	27	56	45	340	234	120	143	241	129	109	70	78	16	62	168	237	261	132	39	11	8	7
5	5	17	6	4	3	17	60	54	72	66	12	9	6	3	15	63	8	27	11	24	78	53	84	71	83	92	97	217	227	96	25	12	7	4	4
1	1	7	2	4	2	3	14	54	63	51	90	9	1	2	22	75	80	53	27	19	61	43	24	6	79	20	79	166	43	151	13	15	2	5	1
1	2	3	2	0	1	1	1	3	12	51	24	16	4	5	10	12	45	54	45	19	42	11	5	4	44	28	58	83	61	63	13	10	21	12	12
2	2	2	1	3	0	1	2	2	9	34	29	22	61	53	2	4	6	5	37	2	42	7	6	0	10	3	1	49	65	26	23	35	11	3	13
29	2	1	8	1	1	1	1	0	1	27	62	40	84	34	0	1	3	6	16	45	51	42	19	6	1	1	5	5	2	28	66	83	15	17	24
6	2	5	6	4	1	0	3	0	0	17	57	131	73	4	4	1	0	3	39	104	61	20	19	2	1	4	3	3	49	10	57	99	98	28	3
2	1	1	0	0	0	0	0	1	0	25	83	85	2	0	1	2	2	2	31	64	4	2	1	1	6	2	2	2	50	23	89	232	115	7	8
1	0	0	0	0	0	0		0	0	31	29	3	1	0	0	0	4	0	0	0	4		0	0	4	1	0	0	0	0	1	93	2	1	7
0	0	0	0	0	0	0	0	0	0	7	13	14	1	1	4	0		0	0	0					0	1	1	1	1	0		0	8		
											12	39	5	2	2	0	0	0			4	1	0	5	4	0	4	0	4	0	0	4	0		
															4	0	6		5									4						4	
																		4																	

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: March 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoys.

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 06, 12, 18 UTC

Elements monitored
:Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (degrees).
:Sea surface temperature (degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the wind observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT
:15 hPa (pressure)
:25 m s^{-1} (vector wind)
:10 degrees (sea surface temperature)

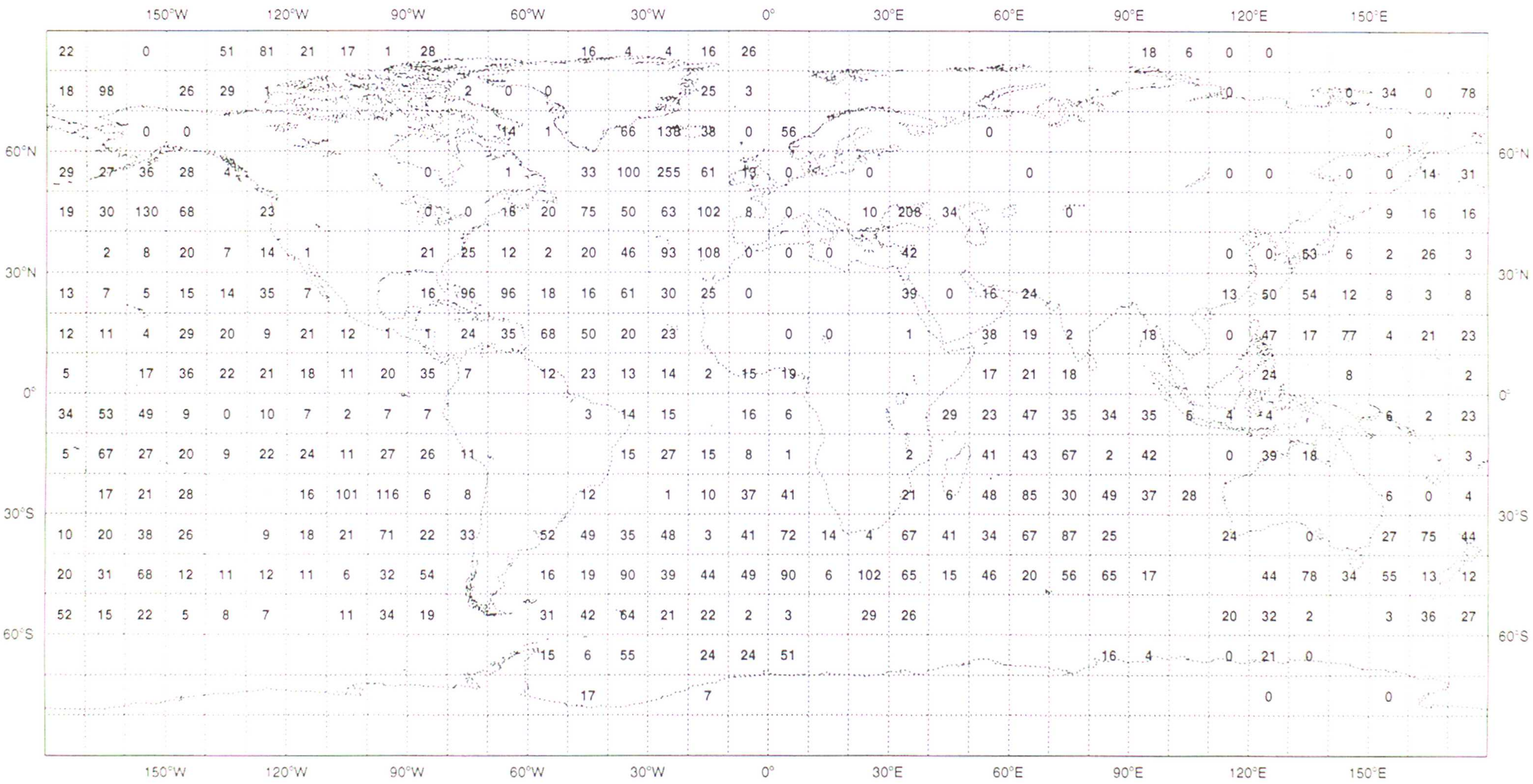
SELECTION CRITERIA : NOBS ≥ 20 , and one or more of the following:

1.|bias|	≥ 4 hPa	(pressure),
	≥ 5 m s^{-1}	(wind speed),
	≥ 30 degrees	(direction).
	≥ 3 degrees	(sea surface temperature).
2.SD	≥ 6 hPa	(pressure),
	≥ 80 degrees	(direction).
	≥ 5 degrees	(sea surface temperature).
3.PGE	≥ 25.	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
16937	-46.6	56.2	ALL	P	SUR	420	145	35	4.2	2.7	5.0
25541	83.8	97.8	ALL	P	SUR	750	293	39	6.5	-2.1	6.9
41625	16.8	-46.2	ALL	P	SUR	83	36	43	3.9	1.9	4.4
44513	38.6	-68.9	ALL	P	SUR	226	158	70	7.9	-4.7	9.2
44514	40.1	-60.4	ALL	P	SUR	257	62	24	8.6	-3.9	9.5
44515	40.7	-62.8	ALL	P	SUR	236	171	72	5.8	-6.9	9.0
44516	40.1	-59.6	ALL	P	SUR	265	83	31	8.6	-2.1	8.9
61530	44.6	33.5	ALL	P	SUR	164	0	0	1.6	-5.9	6.1
61533	34.3	30.8	ALL	P	SUR	245	94	38	5.0	8.7	10.1
61654	44.6	37.1	ALL	P	SUR	327	122	37	7.0	-2.5	7.4
WINS SPEED											
52529	14.5	145.4	ALL	SPEED	SUR	518	7	1	4.0	-5.0	6.4
52537	17.7	149.7	ALL	SPEED	SUR	594	0	0	1.4	-5.3	5.4
SEA SURFACE TEMPERATURE											
16950	-38.8	70.9	ALL	SST	SUR	149	0	0	2.3	-5.2	5.7
21644	46.5	-163.5	ALL	SST	SUR	209	209	100			
21645	53.1	178.6	ALL	SST	SUR	303	77	25	0.2	-0.2	0.3
31974	-41.7	-30.6	ALL	SST	SUR	155	0	0	1.0	4.0	4.1
32618	-32.2	-93.1	ALL	SST	SUR	66	29	44	2.5	0.7	2.6
33502	-32.4	-23.4	ALL	SST	SUR	118	0	0	0.5	4.6	4.7
41563	18.7	-47.6	ALL	SST	SUR	542	203	37	1.8	0.4	1.9
44766	42.4	-50.1	ALL	SST	SUR	107	6	6	1.1	-4.5	4.6
46970	46.0	-123.9	ALL	SST	SUR	92	0	0	3.0	-3.3	4.5
46972	23.8	-126.1	ALL	SST	SUR	207	0	0	0.4	3.4	3.4
51510	12.1	145.1	ALL	SST	SUR	91	0	0	0.6	3.0	3.1
55905	-48.2	-157.1	ALL	SST	SUR	731	0	0	0.3	3.0	3.0
55911	-54.0	-131.3	ALL	SST	SUR	522	0	0	0.6	5.4	5.4
61658	44.4	28.8	ALL	SST	SUR	235	70	30	1.8	6.1	6.3

Figure 2. DRIFTER mean daily count. MARCH 2002
Main hours only
Global average number of observations in 24 hours = 9507



22		0		51	81	21	17	1	28				16	4	4	16	26										18	6	0	0					
18	98		26	29	1					2	0	0				25	3												0			0	34	0	78
		0	0								14	1		66	138	38	0	56					0										0		
29	27	36	28	4					0		1		33	100	255	61	13	0		0				0					0	0		0	0	14	31
19	30	130	68		23				0	0	16	20	75	50	63	102	8	0		10	208	34			0								9	16	16
	2	8	20	7	14	1			21	25	12	2	20	46	93	108	0	0	0		42								0	0	53	6	2	26	3
13	7	5	15	14	35	7			16	96	96	18	16	61	30	25	0				39	0	16	24					13	50	54	12	8	3	8
12	11	4	29	20	9	21	12	1	1	24	35	68	50	20	23			0	0		1		38	19	2		18		0	47	17	77	4	21	23
5		17	36	22	21	18	11	20	35	7		12	23	13	14	2	15	19					17	21	18					24		8			2
34	53	49	9	0	10	7	2	7	7				3	14	15		16	6				29	23	47	35	34	35	6	4	4			6	2	23
5	67	27	20	9	22	24	11	27	26	11				15	27	15	8	1			2		41	43	67	2	42		0	39	18				3
	17	21	28			16	101	116	6	8			12		1	10	37	41			21	6	48	85	30	49	37	28					6	0	4
10	20	38	26		9	18	21	71	22	33		52	49	35	48	3	41	72	14	4	67	41	34	67	87	25			24		0		27	75	44
20	31	68	12	11	12	11	6	32	54			16	19	90	39	44	49	90	6	102	65	15	46	20	56	65	17			44	78	34	55	13	12
52	15	22	5	8	7		11	34	19			31	42	64	21	22	2	3		29	26								20	32	2		3	36	27
												15	6	55		24	24	51								16	4		0	21	0				
													17			7														0			0		

TABLE 3

MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: March 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for synops & autosynops.

Standard of comparison :Background field from UKMO global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Surface pressure (hPa).

Parameters monitored :HT(m) :Station height (in metres) as given in WMO No. 9 Vol A

:RP :Pressure reporting practice
M=mean sea level pressure (hPa) reported.
S=Station level pressure reported.
8=Geopotential height (m) of 850 hPa surface reported.
7=Geopotential height (m) of 700 hPa surface reported.

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:%REJ :Percentage of observations flagged excluding those with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)

SELECTION CRITERIA :NOBS ≥ 20 ,and one or more of the following:

1.|bias| ≥ 4 hPa
2. SD ≥ 6 hPa
3.PGE ≥ 25.

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60437	36.3N	2.8E	981	S8	89	0	0	0	0.9	-6.8	6.9
60476	35.4N	7.2E	1116	S8	77	22	29	0	0.6	14.0	14.0
60728	36.4N	10.7E	1	MS	46	0	0	2	1.8	-8.3	8.5
61492	16.1N	13.5W	18	MS	63	2	3	3	2.7	4.2	5.0
61816	10.9N	14.3W	69	MS	21	9	43	0	0.9	-1.5	1.7
62790	12.1N	24.9E	674	MS	63	5	8	6	1.6	4.7	5.0
63330	13.5N	39.5E	2070	MS	43	43	100	100			
63333	11.1N	39.7E	1903	MS	47	0	0	4	1.7	5.6	5.9
63334	10.3N	37.7E	2515	MS	49	1	2	2	1.3	11.2	11.3
63402	7.7N	36.8E	1725	MS	45	0	0	0	0.9	8.5	8.5
63450	9.0N	38.8E	2354	MS	41	0	0	0	0.6	4.6	4.6
63471	9.6N	41.9E	1260	MS	46	0	0	0	0.7	10.8	10.8
63478	5.9N	43.6E	295	MS	44	0	0	0	0.8	5.7	5.8
63801	4.9S	29.6E	882	S8	29	1	3	0	0.9	8.7	8.7
65355	9.8N	1.1E	342	MS	120	1	1	3	1.6	-11.8	11.9
67231	14.8S	36.5E	606	S8	58	1	2	0	1.2	4.1	4.3
68038	20.5S	26.0E	903	8	90	0	0	1	1.5	4.0	4.3
68114	21.4S	15.9E	1217	M	20	20	100	0			
68338	26.9S	24.6E	1234	S8	56	56	100	0			
68396	26.5S	31.3E	641	S8	48	0	0	0	0.9	5.1	5.2
68575	30.0S	30.0E	1175	S	63	63	100	0			

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
23975	60.4N	88.4E	86	7	119	119	100	3			
24962	60.9N	132.0E	146	MS	45	45	100	100			
30554	54.5N	113.6E	995	MS	123	1	1	0	5.1	4.3	6.7
30967	49.9N	115.8E	623	MS	88	0	0	0	1.4	-7.1	7.2
38744	39.3N	73.3E	4267	8	33	17	52	0	1.8	-0.8	2.0
40741	36.6N	61.2E	235	MS	85	0	0	0	1.2	-4.8	4.9
40757	35.6N	53.4E	1171	MS	87	0	0	3	1.4	4.9	5.1
41254	23.1N	57.7E	1755	S8	80	80	100	0			
41396	16.0N	48.9E	700	MS	36	0	0	3	1.2	6.6	6.7
41466	13.7N	44.1E	1402	8	38	0	0	0	0.5	-5.4	5.4
44212	50.0N	92.1E	940	MS	115	1	1	0	3.2	4.0	5.1
47022	40.8N	128.2E	1200	S	78	0	0	1	1.3	4.4	4.6
47127	36.9N	127.0E	16	MS	120	0	0	0	1.0	-12.4	12.4
48920	8.7N	111.9E	3	MS	117	0	0	1	1.2	-4.0	4.2
51334	44.6N	82.9E	321	M	122	0	0	0	3.7	4.7	6.0
51495	43.5N	91.6E	874	M	121	0	0	0	2.9	7.3	7.9
52602	38.8N	93.4E	2734	S	123	0	0	0	1.4	-6.5	6.6
52866	36.6N	101.8E	2262	S	123	0	0	0	1.1	-4.8	4.9
52955	35.6N	100.8E	3201	S	123	0	0	0	0.8	12.0	12.0
56144	31.8N	98.6E	3184	S	123	0	0	0	1.0	-5.7	5.8
56146	31.6N	100.0E	339	S	119	119	100	0			
56385	29.5N	103.3E	3049	S	123	0	0	6	2.4	-4.5	5.1
56444	28.5N	98.9E	3488	S	118	11	9	0	0.6	13.9	13.9
56462	29.0N	101.5E	2994	S	123	0	0	0	1.6	8.7	8.8

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	128	MS	49	0	0	0	1.2	-5.7	5.8
80342	1.4N	77.3W	1796	S	40	2	5	0	0.7	4.2	4.3
80437	8.6N	71.7W	103	MS	40	6	15	0	1.1	4.9	5.0
82181	2.0S	54.1W	146	MS	77	0	0	0	1.3	5.0	5.2
83235	12.4S	46.4W	604	MS	83	0	0	0	1.1	6.6	6.7

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
83319	14.7S	52.4W	315	MS	79	0	0	0	1.2	4.3	4.5
83332	14.1S	46.4W	826	MS	81	26	32	0	0.8	13.6	13.6
83531	18.6S	46.5W	940	MS	80	0	0	0	0.7	-6.9	6.9
83836	25.5S	50.6W	837	MS	83	0	0	0	0.5	-5.1	5.1
84377	3.8S	73.3W	125	MS	88	0	0	0	1.9	4.7	5.1
84425	5.9S	76.1W	179	MS	69	1	1	1	1.5	5.0	5.2
84455	6.5S	76.4W	281	MS	73	0	0	0	1.1	7.5	7.6
84472	7.1S	78.5W	2620	S	52	0	0	0	0.7	-5.4	5.4
84474	7.2S	76.7W	350	S	24	1	4	4	1.3	11.6	11.7
84686	13.6S	72.0W	3248	S	107	0	0	1	0.9	-4.1	4.2
84688	13.7S	73.4W	3444	S	40	1	3	0	0.7	-12.5	12.5
84720	14.9S	75.0W	567	MS	49	0	0	0	0.6	4.6	4.6
84782	18.1S	70.3W	468	MS	85	0	0	0	1.2	6.9	7.0
85140	14.3S	67.4W	140	MS	59	0	0	0	1.6	4.8	5.1
85141	14.5S	67.6W	204	MS	59	0	0	0	1.6	4.2	4.5
85264	18.5S	64.1W	1998	S	56	56	100	0			
85312	19.8S	63.9W	992	S	45	2	4	4	4.1	-11.2	11.9
85394	22.8S	64.3W	381	MS	27	0	0	19	3.2	6.8	7.5
85432	22.5S	68.9W	2320	S8	81	0	0	0	0.4	5.8	5.8
86065	22.7S	61.5W	220	M	75	0	0	0	1.6	4.5	4.8
88986	59.4S	27.3W	78	MS	474	474	100	0			

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
71023	65.9N	89.5W	18	MS	123	123	100	0			
71094	66.6N	61.6W	393	MS	122	0	0	0	0.9	-4.2	4.3
71176	60.0N	64.2W	551	MS	121	0	0	8	1.9	-4.2	4.6
71177	57.1N	61.5W	834	MS	122	0	0	1	1.9	-4.5	4.9
71506	66.9N	136.3W	720	MS	123	0	0	0	1.1	-4.1	4.2
71747	48.8N	91.6W	424	MS	117	0	0	0	0.7	4.2	4.3
72327	36.1N	86.7W	182	MS	119	0	0	0	0.7	4.1	4.2
76118	30.4N	109.7W	1040	MS	31	0	0	0	0.6	-11.1	11.1
76243	28.7N	100.5W	250	MS	87	2	2	2	1.7	4.1	4.4
76491	23.8N	99.1W	355	MS	95	0	0	2	1.4	4.0	4.2
76543	22.0N	98.8W	104	MS	28	0	0	4	1.3	7.9	8.0
76625	20.6N	100.4W	1813	MS	57	0	0	2	0.8	-9.6	9.6
76640	20.9N	97.4W	28	MS	97	0	0	13	2.0	4.9	5.3
76658	19.2N	103.7W	494	MS	40	1	3	0	0.8	5.4	5.5
76743	18.0N	92.9W	10	MS	58	0	0	0	0.9	6.2	6.3
76855	15.7N	96.5W	43	MS	32	0	0	0	0.7	-5.3	5.3
76903	14.9N	92.3W	118	MS	96	0	0	0	0.6	6.4	6.4

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
92010	6.1S	145.4E	1587	M	41	0	0	0	0.9	10.3	10.3
94322	20.2S	130.0E	340	MS	71	71	100	49			
95815	35.1S	144.0E	72	MS	123	0	0	0	2.6	7.4	7.8
96505	3.7N	115.7E	951	S8	22	20	91	5	3.2	5.7	6.5
97378	10.7S	123.1E	1	MS	35	34	97	0	0.0	-12.7	12.7

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
06685	47.0N	9.1E	515	MS	123	0	0	33	1.3	6.1	6.2
10557	50.5N	11.1E	845	S8	368	368	100	0			
12140	54.4N	18.7E	2	MS	122	0	0	0	0.7	8.2	8.2
13269	44.3N	19.9E	176	MS	119	1	1	3	1.2	8.1	8.2
14554	44.9N	18.4E	140	S	59	2	3	2	2.2	-13.0	13.2
14650	43.8N	18.0E	972	S	60	0	0	0	0.9	4.8	4.9
15140	46.5N	22.4E	500	S8	21	21	100	0			
16036	46.0N	12.6E	128	MS	24	0	0	46	4.2	5.1	6.6
16470	36.8N	12.0E	191	MS	108	0	0	0	0.7	-4.0	4.1
17092	39.8N	39.5E	1218	S8	122	0	0	0	1.7	6.6	6.8
17203	38.9N	40.5E	1177	S8	123	0	0	0	1.3	8.9	9.0

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89004	71.7S	2.8W	815	MS	99	0	0	0	1.2	-5.8	5.9
89208	90.0S	0.0W	2835	M	30	18	60	0	0.6	-0.9	1.1
89253	63.2S	55.4W	75	M	212	0	0	2	1.8	4.9	5.2
89263	66.0S	66.1W	20	M	222	2	1	0	1.5	9.5	9.6
89264	71.4S	68.9W	780	S	279	0	0	0	1.1	7.4	7.5
89266	72.2S	60.3W	91	S	236	227	96	0	7.3	-11.6	13.7
89272	74.8S	71.5W	1369	S	265	265	100	0			
89512	70.8S	11.8E	140	MS	122	1	1	0	1.1	-4.1	4.2
89612	66.3S	110.8E	390	S	252	211	84	0	2.6	-1.6	3.1
89637	69.9S	130.0E	2560	S	315	76	24	0	0.9	13.8	13.8
89744	74.0S	43.0E	3353	S	283	0	0	0	0.9	7.2	7.3
89769	78.5S	168.4E	50	S	397	397	100	0			
89847	67.6S	146.0E	30	S	309	0	0	0	2.1	-8.6	8.9

TABLE 4A

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: March 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAH	1833	0	40	1.7	0.4	1823	0	40	0	7.8	0.4
AAL	5957	1	32	1.6	0.1	5885	0	32	0	7.4	0.2
AAR	1493	0	5	1.8	-0.6	1504	1	6	0	7.1	0.7
ACA	3261	0	11	1.7	-0.1	3189	0	11	0	7.4	0.6
ACI	25	0	40	1.1	0.8	26	0	42	0	10.5	-1.2
AEA	975	0	2	1.7	0.5	790	0	3	0	7.2	0.7
AEL	881	1	9	1.8	-0.9	802	1	11	0	7.8	0.4
AEY	340	1	6	2.1	1.1	306	0	6	0	7.6	0.6
AFL	507	0	2	1.6	0.5	488	0	3	0	6.7	0.5
AFR	1856	1	8	1.7	0.2	1684	0	9	0	8.0	0.5
AIH	438	0	4	1.8	-0.1	408	0	4	0	8.5	0.7
AIS	49	0	6	1.8	0.1	50	0	2	0	6.1	1.7
AJM	298	0	4	1.7	-0.3	267	0	3	0	7.5	0.8
AMM	94	2	7	1.5	0.4	85	0	78	0	7.9	-0.5
AMT	692	0	40	1.8	0.9	688	0	40	0	6.9	0.0
AMX	366	2	4	1.9	0.0	333	0	5	0	9.7	1.1
ANA	611	0	8	1.6	0.5	618	0	10	0	8.3	1.1
ANZ	4958	0	34	1.4	0.5	4928	0	34	0	6.6	1.0
AVA	275	0	2	1.7	0.6	238	0	4	0	8.5	0.7
AVE	200	3	8	2.0	0.6	164	1	6	0	9.5	0.8
AVN	142	0	47	1.0	0.1	139	1	48	0	5.3	0.4
AXF	22	0	18	0.5	0.1	20	0	20	0	6.4	1.0
AZA	627	2	7	2.1	0.3	587	0	5	0	8.0	0.3
BAL	323	2	12	1.6	0.0	297	1	11	0	7.8	1.2
BAW	933	1	8	1.7	-0.4	890	0	8	0	6.5	0.7
BLX	39	0	5	1.4	-0.3	35	0	6	0	10.9	0.1
BSK	27	0	7	2.4	0.3	29	0	7	0	12.9	1.8
BWA	307	1	5	2.1	1.5	269	1	6	0	6.5	0.9
CAL	68	0	4	1.9	0.1	70	0	0	0	6.6	0.9
CCA	236	2	14	2.4	0.1	264	1	100	0	12.7	0.4
CES	335	0	8	1.9	0.5	337	1	9	0	9.7	0.6
CFG	1080	1	4	1.5	-0.5	1024	0	4	0	7.7	0.5
CKS	266	0	40	2.0	0.7	267	0	39	0	7.5	0.9
CLX	457	2	7	1.6	-0.3	421	0	7	0	6.2	0.4
CMI	55	0	25	2.0	0.3	63	0	22	0	8.5	-0.4
COA	996	1	45	1.3	-0.2	988	0	45	0	6.1	0.5
CPA	36	3	3	1.2	0.6	37	5	8	0	9.6	-0.4
CRL	979	1	5	1.6	0.4	875	0	6	0	8.6	0.7
CSN	75	0	13	2.7	0.1	73	0	10	0	6.6	1.8
CUB	242	1	5	2.4	1.2	217	0	4	0	9.3	0.6
DAF	22	0	0	1.2	0.1	21	0	0	0	4.5	1.8
DAL	2550	1	37	1.5	-0.2	2512	0	38	0	7.2	-0.1
DCE	147	0	7	1.1	0.0	135	0	8	0	8.2	0.8
DCS	24	0	4	2.5	-0.2	23	0	0	0	5.6	1.9
DLH	1395	0	14	1.5	0.1	1341	0	15	0	7.0	1.0
EDW	118	0	1	1.7	-0.2	109	0	4	0	8.1	0.4
EEZ	157	0	7	1.6	0.6	138	0	9	0	8.3	1.0
EIA	311	0	12	2.0	0.4	310	1	100	0	14.7	2.8
ELY	126	1	8	1.4	-0.3	127	0	9	0	8.1	0.5
ETH	30	0	10	1.3	-0.2	31	3	13	0	5.4	1.0
EVA	119	0	10	1.3	-0.2	124	0	10	0	7.3	-0.3
EWW	71	0	1	1.4	0.2	77	1	3	0	8.5	1.1
FDX	2030	0	41	1.6	0.3	2031	0	42	0	7.6	0.6
FIN	257	0	3	1.4	0.2	246	0	5	0	7.6	0.4
FJI	873	1	48	1.3	0.4	857	0	48	0	6.8	0.8
FOM	664	0	33	1.3	0.1	658	0	33	0	6.3	0.9
GAF	31	0	0	1.3	-0.4	32	0	0	0	5.6	-0.3
GCO	219	0	18	1.6	0.3	218	0	100	0	13.2	2.2
GHA	51	0	4	2.2	-0.2	47	2	9	0	11.5	1.1

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
GRL	33	0	0	1.3	-0.2	34	0	3	0	6.9	1.3
GTI	299	1	7	1.7	-0.2	304	0	7	0	7.4	1.0
HAL	3748	1	35	1.6	0.0	3717	0	35	0	9.3	0.9
HZA	25	0	20	1.4	-0.4	30	0	17	0	6.0	0.8
IBE	3377	0	6	1.7	0.4	2851	0	7	0	7.7	0.5
ICE	888	0	2	1.4	0.0	865	0	2	0	5.7	0.5
IWD	201	0	2	1.3	-0.6	156	0	5	0	7.5	0.9
JAA	104	1	6	2.1	1.0	104	2	65	0	7.6	1.4
JAL	2616	0	4	1.8	0.4	2614	0	4	0	8.0	0.6
JAZ	894	0	3	1.9	0.9	897	0	4	0	8.4	0.5
JKK	63	0	5	1.1	-0.5	55	0	9	0	12.1	1.4
KAI	31	6	39	2.5	1.7	31	0	35	0	8.7	0.4
KAL	2677	1	10	1.9	0.1	2686	0	10	0	8.4	0.6
KLM	1960	0	4	1.6	0.1	1787	0	5	0	6.8	0.5
LAN	97	8	21	3.1	1.6	94	0	68	0	10.7	-0.5
LAP	60	8	43	2.6	1.8	62	0	34	0	6.5	0.6
LDA	105	1	8	1.2	-0.1	88	0	7	0	7.6	0.7
LDI	719	1	100	1.9	-0.1	627	0	6	0	7.9	0.3
LIB	1089	1	8	1.8	0.9	937	0	9	0	8.8	0.4
LOT	141	1	4	2.0	-0.8	144	0	3	0	5.7	-0.4
LTU	771	0	5	1.4	-0.2	683	1	6	0	7.0	0.3
MAS	239	0	4	1.7	0.0	257	0	3	0	7.4	0.6
MON	117	2	3	1.3	-0.1	108	0	3	0	6.3	1.4
MPD	263	0	3	1.6	-0.1	211	0	4	0	6.6	0.0
MPH	664	0	3	1.8	-0.7	641	0	3	0	7.4	0.4
NCA	798	1	5	1.9	0.2	708	0	4	0	6.9	0.6
NWA	9452	1	10	1.7	0.4	9452	0	10	0	7.7	0.6
NZL	4213	0	14	1.2	0.2	4213	0	14	0	5.3	0.5
OAE	248	0	35	1.4	-0.4	253	0	37	0	10.7	1.5
PAC	438	1	26	2.0	-0.3	444	0	24	0	9.3	0.0
PAL	1403	0	11	1.6	-0.2	1357	0	12	0	8.4	0.9
PAO	310	1	55	1.6	0.1	306	0	55	0	7.3	0.8
PUA	37	0	30	3.0	1.4	37	0	35	0	16.1	-1.8
QFA	3164	0	52	1.4	0.3	3149	0	52	0	6.1	1.1
RAF	38	5	21	2.1	0.0	36	3	31	0	19.6	2.4
RAM	63	0	8	2.0	-1.3	51	0	10	0	11.1	0.1
RCH	532	2	100	2.6	-0.3	519	1	100	0	13.5	1.1
RJA	23	0	4	1.8	-0.2	24	0	4	0	5.9	-0.6
RON	34	0	47	0.9	0.6	38	3	55	0	16.3	-2.5
RRR	67	4	15	2.1	-0.8	68	1	15	0	7.5	1.8
RYN	238	0	40	1.3	0.6	236	0	42	0	7.1	-0.4
RZO	312	1	71	3.9	2.1	234	0	5	0	9.1	1.1
SAA	400	0	5	1.8	-0.5	376	1	5	0	8.1	0.7
SIA	289	0	4	1.3	0.3	294	0	5	0	6.9	0.4
SLR	268	0	6	1.4	-0.1	252	1	9	0	7.8	0.2
SQC	39	0	0	1.7	0.9	39	0	0	0	6.4	1.7
SVA	36	3	11	1.5	0.2	45	0	9	0	8.2	0.8
TAG	24	0	42	1.9	-0.7	24	4	42	0	6.5	-0.1
TAM	30	10	27	2.6	1.5	28	7	100	0	9.3	-1.1
TAP	649	1	2	1.6	-0.4	460	0	3	0	7.4	0.6
THA	130	0	4	1.3	0.4	131	0	5	0	7.7	0.6
THT	65	2	32	1.3	0.4	64	0	33	0	7.1	2.4
TPA	48	0	4	1.2	0.2	47	0	4	0	6.9	0.7
TSC	35	6	9	1.9	-0.1	32	0	3	0	8.7	-0.4
UAL	148072	0	99	1.3	-0.1	147991	0	99	0	5.3	0.6
UPS	1985	0	54	1.8	0.3	1973	0	54	0	7.7	0.2
USA	168	1	3	1.5	0.0	151	1	5	0	8.0	0.7
VIR	468	0	4	1.6	0.0	455	0	5	0	7.8	1.0
VPB	23	0	13	1.9	-0.1	23	0	9	0	7.4	3.5

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
VRG	147	1	71	2.3	1.2	146	1	100	0	12.1	-0.2
VVR	147	1	33	2.9	1.3	148	0	31	0	8.6	1.1
WOA	252	0	13	1.6	0.5	259	0	17	0	8.8	1.7
YSS	73	3	4	1.7	1.0	61	0	7	0	8.6	-0.8
AU	41548	0	11	1.3	0.6	41584	0	11	0	5.3	0.6
EU	123325	0	34	1.3	0.2	123324	0	34	0	4.7	0.5
KL	1945	0	14	1.3	0.7	1934	0	14	0	5.2	1.1
MK	5375	0	6	1.8	1.4	5348	0	6	0	7.0	1.6
SA	7794	0	69	2.2	1.8	7770	0	8	0	5.6	0.5
TN	42	0	21	2.0	0.6	44	2	25	0	8.2	-1.0
WA	348	1	9	1.6	0.5	345	3	11	0	8.0	1.0
XX	3508	2	10	1.4	0.2	3495	0	11	0	9.3	1.5
N	898	1	23	2.3	0.7	922	0	22	0	8.4	1.0
US ACARS	960573	1	59	1.5	0.4	960562	0	58	0	5.5	0.8

TABLE 4B

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: March 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :1000.0 – 300.1 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

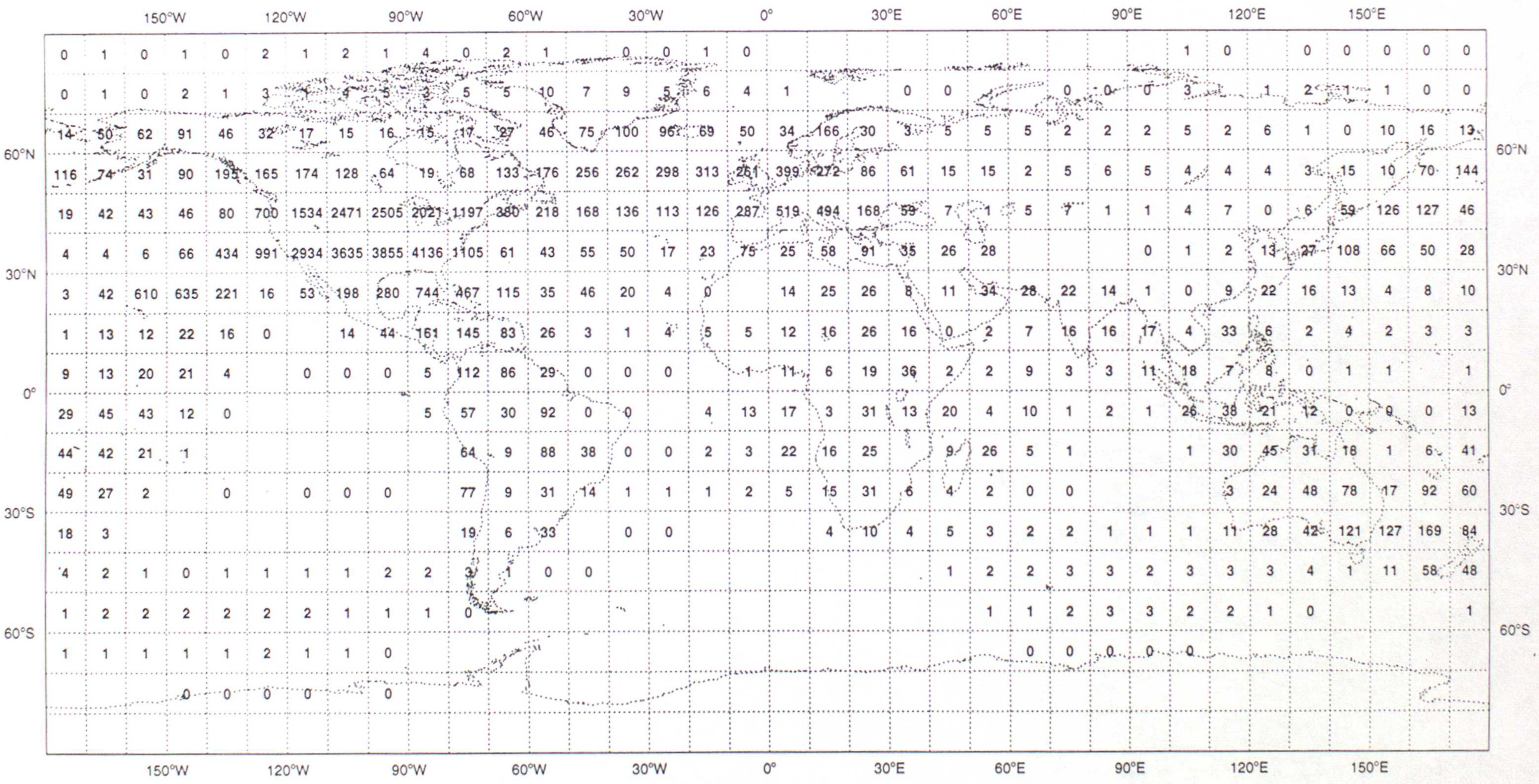
SELECTION CRITERIA :N REP ≥ 20

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAH	33	9	45	2.4	-1.1	33	0	36	0	9.9	4.1
AAL	468	1	36	1.4	0.1	465	0	36	0	6.0	0.5
AAR	32	3	25	2.2	-1.2	32	0	19	0	7.4	1.0
ACA	39	3	23	1.4	-0.4	40	0	23	0	9.7	-1.5
ACI	21	10	62	0.8	0.1	21	0	62	0	14.0	3.6
AEL	25	0	8	2.4	-1.3	26	0	4	0	12.8	-1.7
AER	480	0	81	1.3	0.2	480	0	81	0	3.3	0.2
AEY	26	4	8	1.9	0.9	23	0	9	0	8.0	-0.8
AFR	108	5	8	1.4	0.5	105	0	10	0	11.4	0.5
ANA	29	3	17	0.9	0.5	29	0	14	0	7.6	1.4
ANZ	226	1	27	1.6	0.1	230	0	25	0	5.3	0.8
ATN	29	0	28	3.3	-1.9	28	0	18	0	10.6	0.0
AXF	56	4	29	1.3	0.1	55	0	29	0	8.6	1.2
AZA	48	0	8	1.4	0.3	44	0	11	0	6.8	0.7
BAF	42	7	19	3.0	0.9	41	0	7	0	9.6	1.7
CFC	111	0	10	1.2	0.7	100	0	13	0	7.5	0.1
CFG	53	0	2	1.4	-0.6	44	2	9	0	9.8	-0.1
CLX	31	0	13	1.5	-0.8	28	0	14	0	5.0	0.3
COA	226	1	47	1.5	-0.1	227	0	47	0	6.5	-0.3
CRL	47	0	9	2.1	0.3	44	0	9	0	8.8	0.5
CTM	26	8	15	2.6	-1.9	25	0	8	0	8.8	2.9
CUB	70	1	3	1.9	1.0	57	0	2	0	6.6	0.6
DAL	604	1	47	1.7	0.2	596	0	45	0	6.6	1.2
DHL	66	2	76	6.4	-6.2	60	2	25	0	14.3	2.8
DLH	281	2	15	1.2	0.1	278	0	15	0	7.1	1.3
EIA	22	0	14	1.6	0.1	22	0	100	0	17.6	1.1
ELY	37	0	11	1.6	-0.4	39	0	10	0	7.1	0.2
EWW	114	0	5	1.5	0.4	112	0	7	0	8.9	0.0
FDX	470	1	33	1.6	0.4	464	0	35	0	9.5	0.5
FIN	40	0	3	1.2	0.3	39	0	3	0	7.0	0.3
GAF	46	4	11	1.4	0.4	45	0	7	0	7.5	0.6
GCO	438	0	8	1.8	0.1	441	0	100	0	17.4	5.0
GHA	30	7	20	1.3	-0.4	26	0	19	0	10.7	1.5
GTI	66	2	8	1.6	-0.2	69	0	10	0	8.5	0.6
HAL	198	1	42	2.0	0.3	197	0	41	0	6.8	0.8
IBE	93	1	9	1.6	0.3	84	0	10	0	5.8	-0.3
ICE	44	0	2	1.4	-0.8	43	2	5	0	7.8	1.9
JAA	57	2	9	2.0	0.8	57	0	93	0	12.6	2.8
JAL	182	1	4	1.7	0.8	180	0	5	0	9.2	0.8
JAZ	153	2	7	1.7	0.7	155	0	5	0	7.6	1.1
KAL	118	0	17	1.3	-0.3	117	0	18	0	6.7	0.6
KIW	41	2	34	3.3	1.7	41	0	32	0	9.2	3.4
KLM	130	0	3	1.4	0.2	114	0	4	0	5.9	0.5
LAN	130	4	17	3.2	0.6	131	0	67	0	10.4	4.4
LIB	111	1	5	1.4	1.0	109	0	6	0	6.4	0.4
LTU	37	0	14	1.8	0.0	34	0	15	0	12.1	0.3
MAS	44	0	30	1.5	-0.8	43	0	30	0	9.1	0.0
MPH	62	0	0	1.4	-0.1	59	0	0	0	6.0	0.6
NCA	152	1	1	1.6	0.3	127	0	2	0	8.3	0.1
NWA	543	1	17	1.9	0.7	540	0	17	0	8.2	0.3
NZL	19738	0	58	1.6	0.6	19735	0	58	0	5.2	0.3
PAC	24	0	17	1.9	-0.2	26	0	15	0	5.1	1.1
PAL	26	0	8	1.0	-0.5	23	0	9	0	7.1	1.5
QFA	160	1	43	1.3	0.6	160	0	44	0	6.0	1.0
RCH	185	3	100	3.6	-1.1	167	1	100	0	14.5	1.6
RRR	132	2	17	3.0	1.5	137	0	17	0	11.6	0.7
SAA	60	3	3	1.2	-0.6	60	0	5	0	9.1	-0.5
SIA	34	0	3	0.8	0.3	35	0	6	0	12.0	0.9
UAL	258006	0	100	1.2	0.0	257672	0	100	0	4.6	0.2

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
UPS	166	1	51	1.8	0.0	159	0	52	0	8.8	0.3
VTA	22	0	14	2.8	-1.7	24	0	4	0	6.0	1.3
VVP	46	13	70	5.2	4.9	39	0	69	0	18.2	3.0
WOA	29	0	7	1.1	0.0	31	0	10	0	8.0	0.0
AU	32915	0	52	1.2	0.2	32965	0	52	0	4.1	0.4
EU	684312	0	71	1.0	0.2	681035	0	71	0	4.2	0.0
KL	1586	0	57	1.3	0.6	1582	0	57	0	4.3	0.5
MK	3901	0	54	1.4	0.7	3892	0	55	0	5.5	0.7
SA	5782	0	83	1.8	0.9	5773	0	59	0	4.6	0.7
WA	81	4	5	1.5	0.8	80	0	6	0	8.1	1.8
XX	1090	3	10	1.7	0.1	1088	1	13	0	11.4	2.4
US ACARS	1995436	0	80	1.3	0.3	1988161	0	80	0	4.6	0.2

Figure 3a. AIRCRAFT 300 - 150 hPa mean daily count. MARCH 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 44520



0	1	0	1	0	2	1	2	1	4	0	2	1		0	0	1	0											1	0		0	0	0	0	0
0	1	0	2	1	3	1	4	5	3	5	5	10	7	9	5	6	4	1			0	0			0	0	0	3		1	2	1	1	0	0
14	50	62	91	46	32	17	15	16	15	17	27	46	75	100	96	69	50	34	166	30	3	5	5	5	2	2	2	5	2	6	1	0	10	16	13
116	74	31	90	195	165	174	128	64	19	68	133	176	256	262	298	313	261	399	272	86	61	15	15	2	5	6	5	4	4	4	3	15	10	70	144
19	42	43	46	80	700	1534	2471	2505	2021	1197	380	218	168	136	113	126	287	519	494	168	59	7	1	5	7	1	1	4	7	0	6	59	126	127	46
4	4	6	66	434	991	2934	3635	3855	4136	1105	61	43	55	50	17	23	75	25	58	91	35	26	28				0	1	2	13	27	108	66	50	28
3	42	610	635	221	16	53	198	280	744	467	115	35	46	20	4	0		14	25	26	8	11	34	28	22	14	1	0	9	22	16	13	4	8	10
1	13	12	22	16	0		14	44	161	145	83	26	3	1	4	5	5	12	16	26	16	0	2	7	16	16	17	4	33	6	2	4	2	3	3
9	13	20	21	4		0	0	0	5	112	86	29	0	0	0		1	11	6	19	36	2	2	9	3	3	11	18	7	8	0	1	1		1
29	45	43	12	0					5	57	30	92	0	0		4	13	17	3	31	13	20	4	10	1	2	1	26	38	21	12	0	9	0	13
44	42	21	1							64	9	88	38	0	0	2	3	22	16	25		9	26	5	1			1	30	45	31	18	1	6	41
49	27	2		0		0	0	0		77	9	31	14	1	1	1	2	5	15	31	6	4	2	0	0				3	24	48	78	17	92	60
18	3									19	6	33		0	0				4	10	4	5	3	2	2	1	1	1	11	28	42	121	127	169	84
4	2	1	0	1	1	1	1	2	2	3	1	0	0									1	2	2	3	3	2	3	3	3	4	1	11	58	48
1	2	2	2	2	2	2	1	1	1	0													1	1	2	3	3	2	2	1	0				1
1	1	1	1	1	2	1	1	0																0	0	0	0	0							
			0	0	0	0		0																											

Figure 3b. AIRCRAFT 1000 - 301 hPa mean daily count. MARCH 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 96755

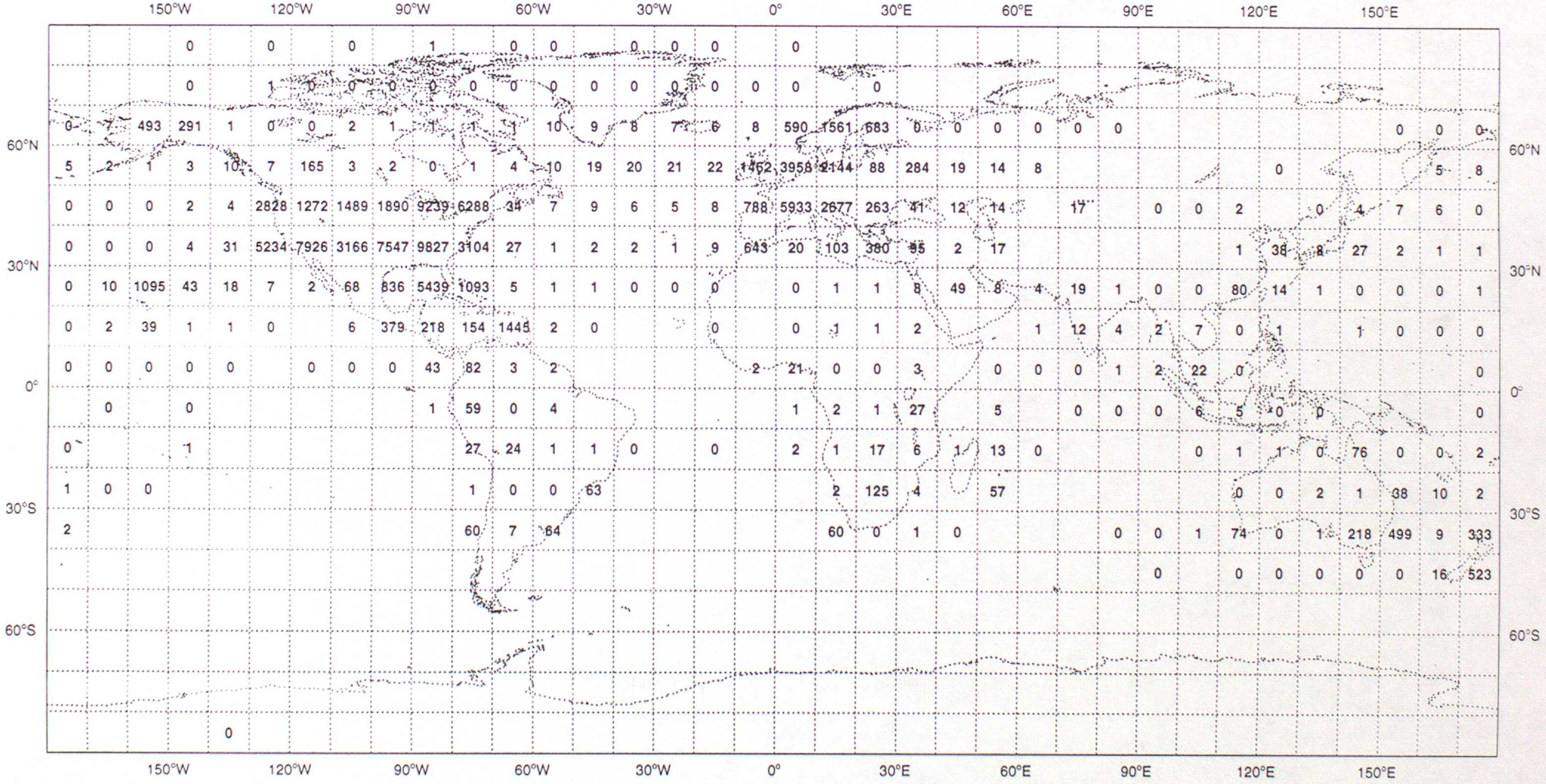

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0 0 0 1 0 0 0 0 0 0
0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 7 493 291 1 0 0 2 1 1 1 10 9 8 7 6 8 590 1561 683 0 0 0 0 0 0 0 0 0
5 2 1 3 10 7 165 3 2 0 1 4 10 19 20 21 22 1462 3958 2144 88 284 19 14 8 0 5 8
0 0 0 2 4 2828 1272 1489 1890 9239 6288 34 7 9 6 5 8 788 5933 2677 263 41 12 14 17 0 0 2 0 4 7 6 0
0 0 0 4 31 5234 7926 3166 7547 9827 3104 27 1 2 2 1 9 643 20 103 380 55 2 17 1 38 8 27 2 1 1
0 10 1095 43 18 7 2 68 836 5439 1093 5 1 1 0 0 0 0 1 1 8 49 8 4 19 1 0 0 80 14 1 0 0 0 1
0 2 39 1 1 0 6 379 218 154 1445 2 0 0 0 1 1 2 1 12 4 2 7 0 1 1 0 0 0
0 0 0 0 0 0 0 0 43 82 3 2 2 21 0 0 3 0 0 0 1 2 22 0 0
0 0 1 59 0 4 1 2 1 27 5 0 0 0 6 5 0 0 0
0 1 27 24 1 1 0 0 2 1 17 6 1 13 0 0 1 1 0 76 0 0 2
1 0 0 1 0 0 63 2 125 4 57 0 0 2 1 38 10 2
2 60 7 64 60 0 1 0 0 0 1 74 0 1 218 499 9 333
0 0 0 0 0 0 16 523
0

Figure 4a. AIRCRAFT 300 - 150 hPa mean winds. MARCH 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

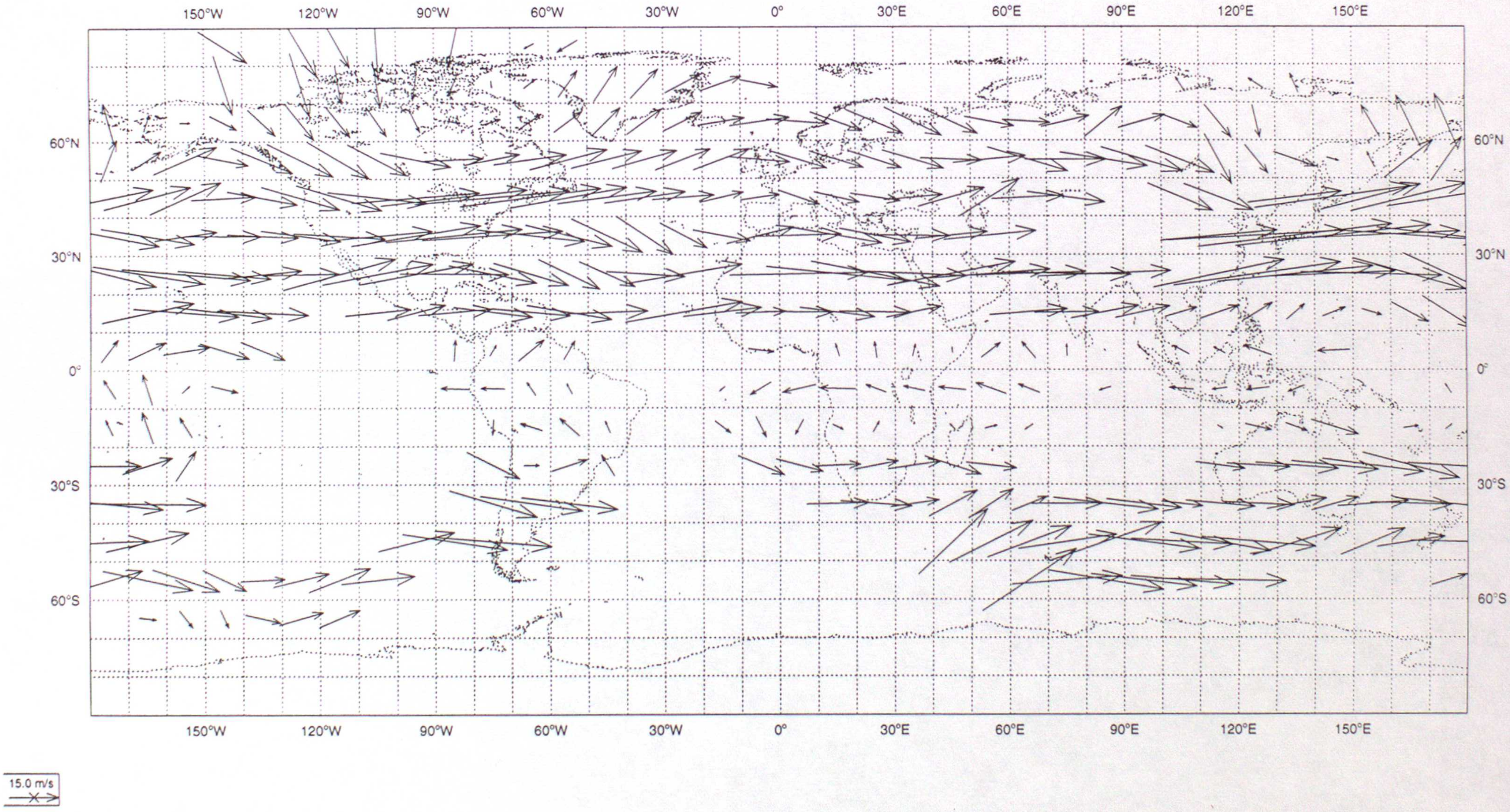

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 4b. AIRCRAFT 1000 - 301 hPa mean winds. MARCH 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

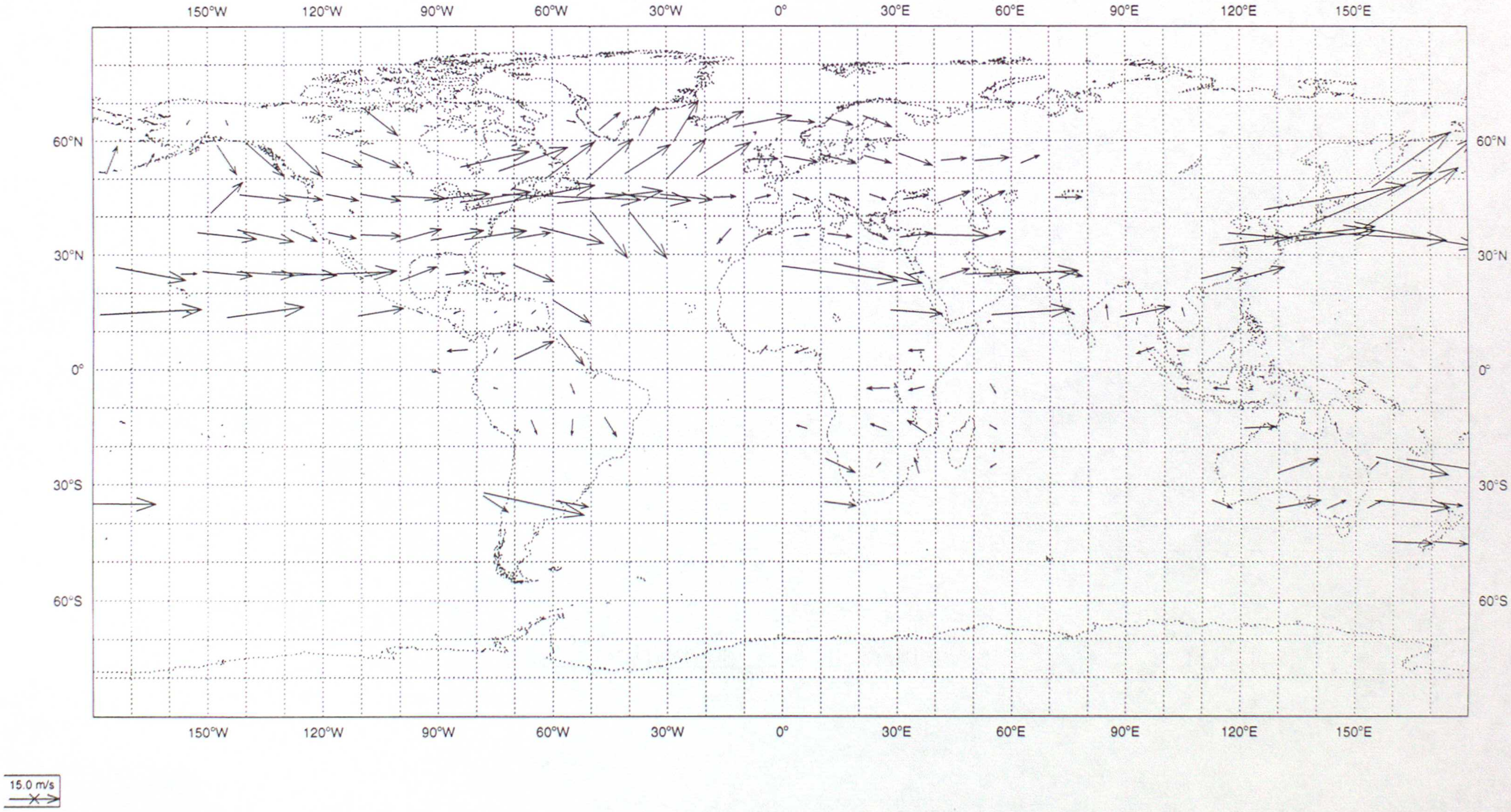

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 5a. AIRCRAFT 300 - 150 hPa mean O-B winds. MARCH 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

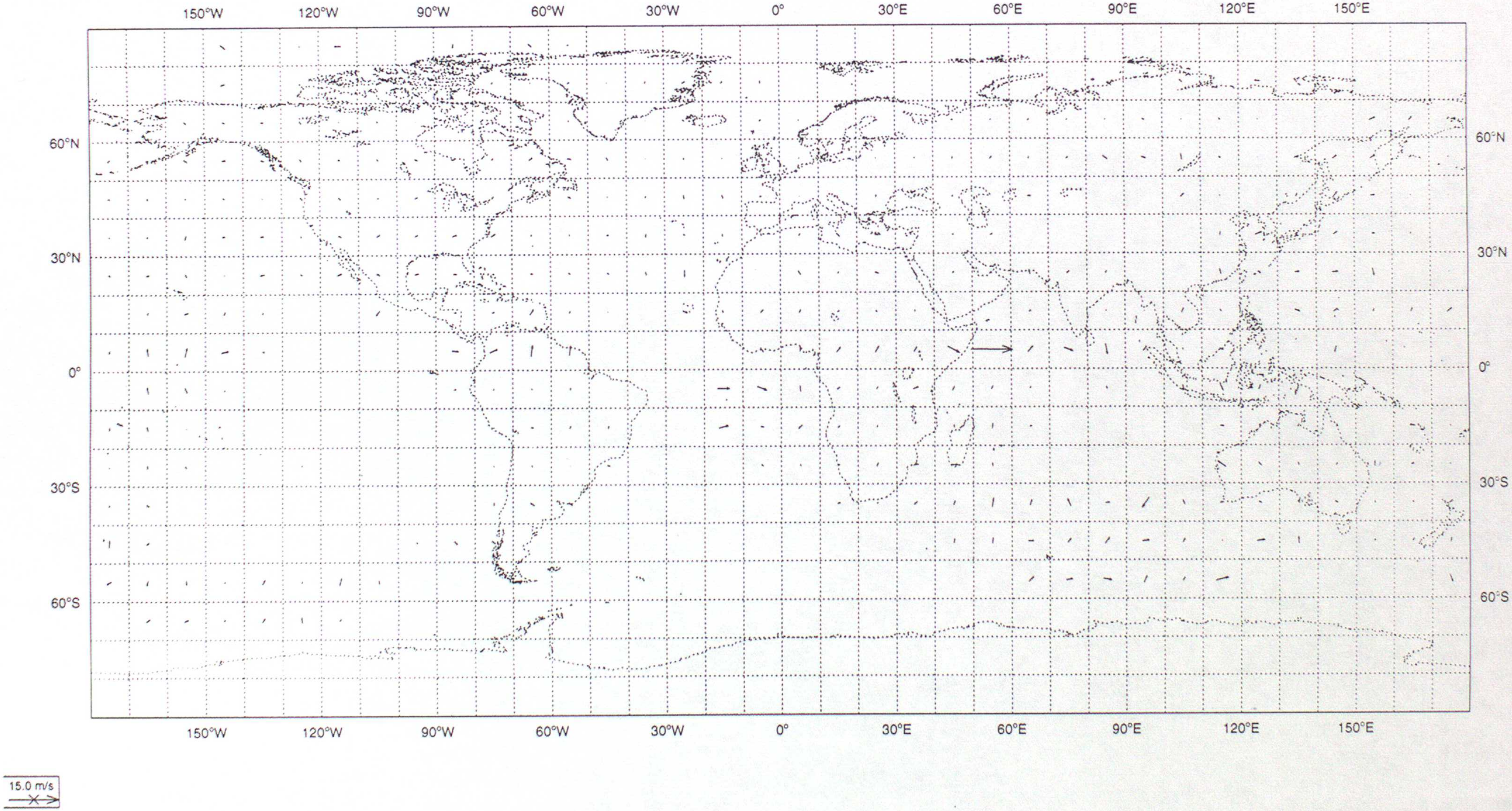

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 5b. AIRCRAFT 1000 - 301 hPa mean O-B winds. MARCH 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

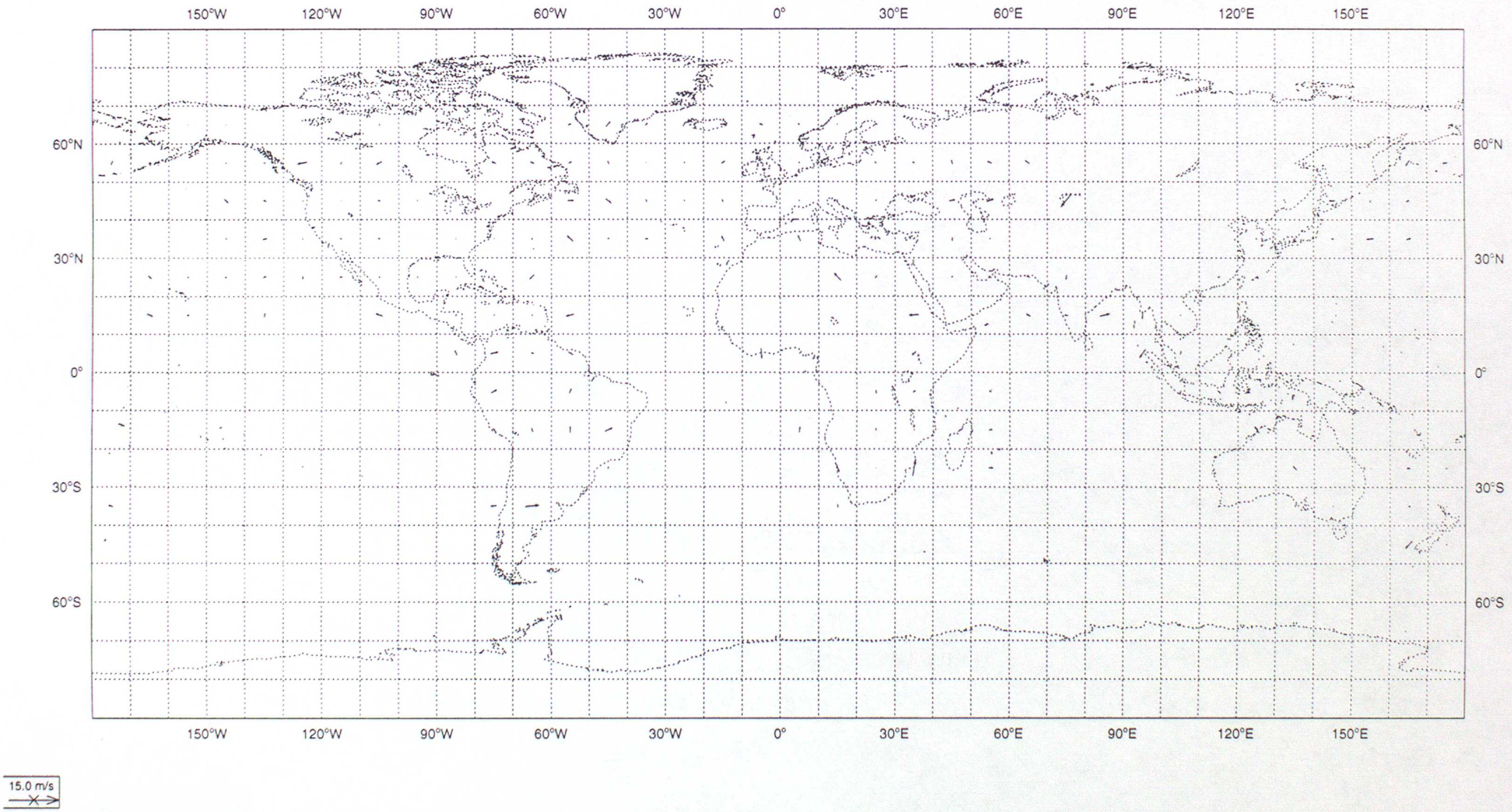

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 6a. AIRCRAFT 300 - 150 hPa mean O-B speeds (ms-1). MARCH 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

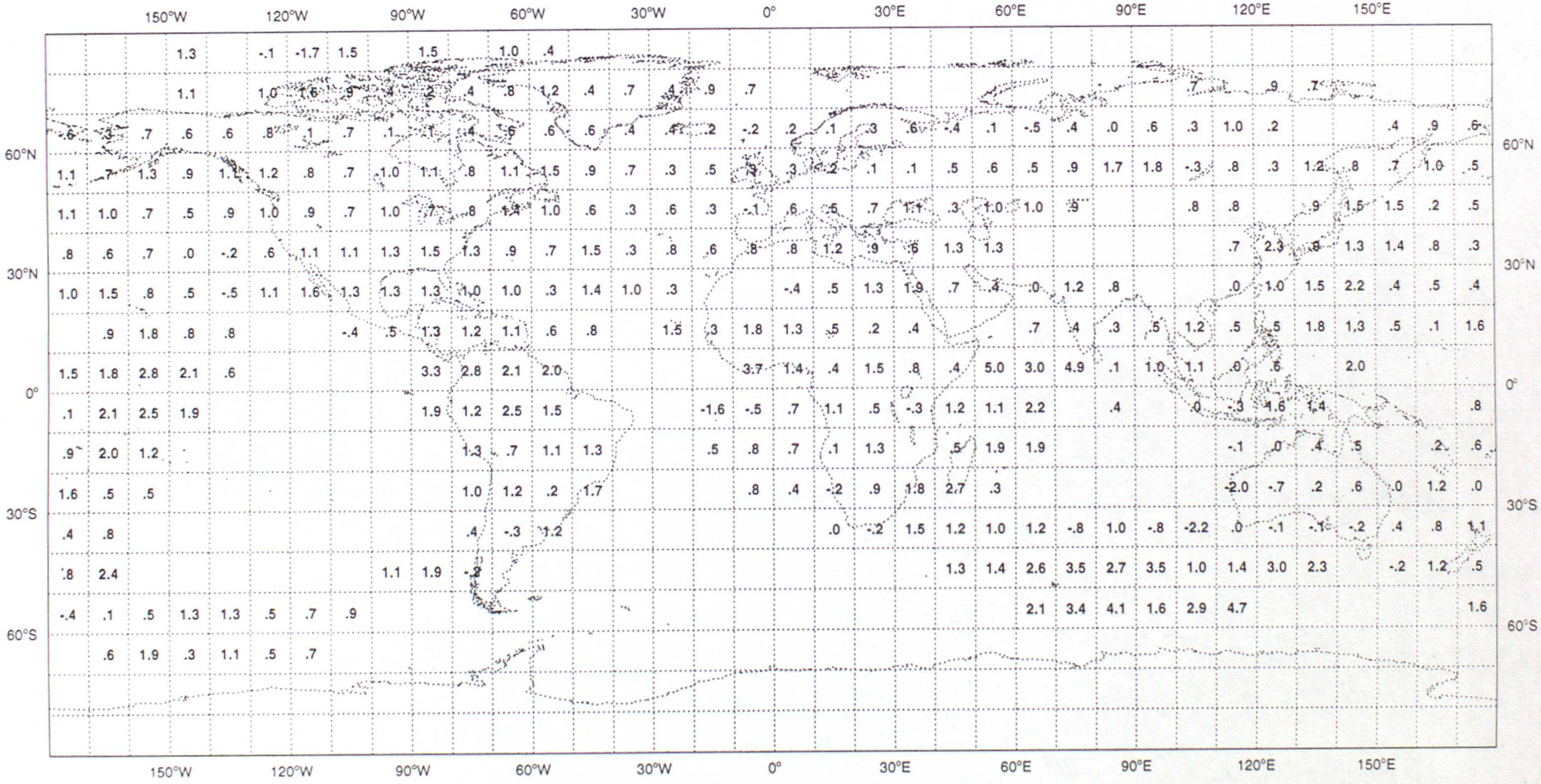

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
1.3 -.1 -1.7 1.5 1.5 1.0 .4
1.1 1.0 1.6 .9 .4 .2 .4 .8 1.2 .4 .7 .4 .9 .7 .7 .9 .7
.6 .3 .7 .6 .6 .8 .1 .7 .1 .1 .4 .6 .6 .6 .4 .4 .2 -.2 .2 .1 .3 .6 -.4 .1 -.5 .4 .0 .6 .3 1.0 .2 .4 .9 .6
1.1 .7 1.3 .9 1.1 1.2 .8 .7 1.0 1.1 .8 1.1 1.5 .9 .7 .3 .5 .3 .2 .1 .1 .5 .6 .5 .9 1.7 1.8 -.3 .8 .3 1.2 .8 .7 1.0 .5
1.1 1.0 .7 .5 .9 1.0 .9 .7 1.0 .7 .8 1.4 1.0 .6 .3 .6 .3 -.1 .6 .5 .7 1.1 .3 1.0 1.0 .9 .8 .8 .9 1.5 1.5 .2 .5
.8 .6 .7 .0 -.2 .6 1.1 1.1 1.3 1.5 1.3 .9 .7 1.5 .3 .8 .6 .8 .8 1.2 .9 .6 1.3 1.3 .7 2.3 .8 1.3 1.4 .8 .3
1.0 1.5 .8 .5 -.5 1.1 1.6 1.3 1.3 1.3 1.0 1.0 .3 1.4 1.0 .3 -.4 .5 1.3 1.9 .7 .4 .0 1.2 .8 .0 1.0 1.5 2.2 .4 .5 .4
.9 1.8 .8 .8 -.4 .5 1.3 1.2 1.1 .6 .8 1.5 .3 1.8 1.3 .5 .2 .4 .7 .4 .3 .5 1.2 .5 .5 1.8 1.3 .5 .1 1.6
1.5 1.8 2.8 2.1 .6 3.3 2.8 2.1 2.0 3.7 1.4 .4 1.5 .8 .4 5.0 3.0 4.9 .1 1.0 1.1 .0 .6 2.0
.1 2.1 2.5 1.9 1.9 1.2 2.5 1.5 -1.6 -.5 .7 1.1 .5 -.3 1.2 1.1 2.2 .4 .0 -.3 1.6 1.4 .8
.9 2.0 1.2 1.3 .7 1.1 1.3 .5 .8 .7 .1 1.3 .5 1.9 1.9 -.1 .0 .4 .5 .2 .6
1.6 .5 .5 1.0 1.2 .2 1.7 .8 .4 -.2 .9 1.8 2.7 .3 -2.0 -.7 .2 .6 .0 1.2 .0
.4 .8 .4 -.3 1.2 .0 -.2 1.5 1.2 1.0 1.2 -.8 1.0 -.8 -2.2 .0 -.1 -.1 -.2 .4 .8 1.1
.8 2.4 1.1 1.9 -.2 1.3 1.4 2.6 3.5 2.7 3.5 1.0 1.4 3.0 2.3 -.2 1.2 .5
-.4 .1 .5 1.3 1.3 .5 .7 .9 2.1 3.4 4.1 1.6 2.9 4.7 1.6
.6 1.9 .3 1.1 .5 .7

Figure 6b. AIRCRAFT 1000 - 301 hPa mean O-B speeds (ms-1). MARCH 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

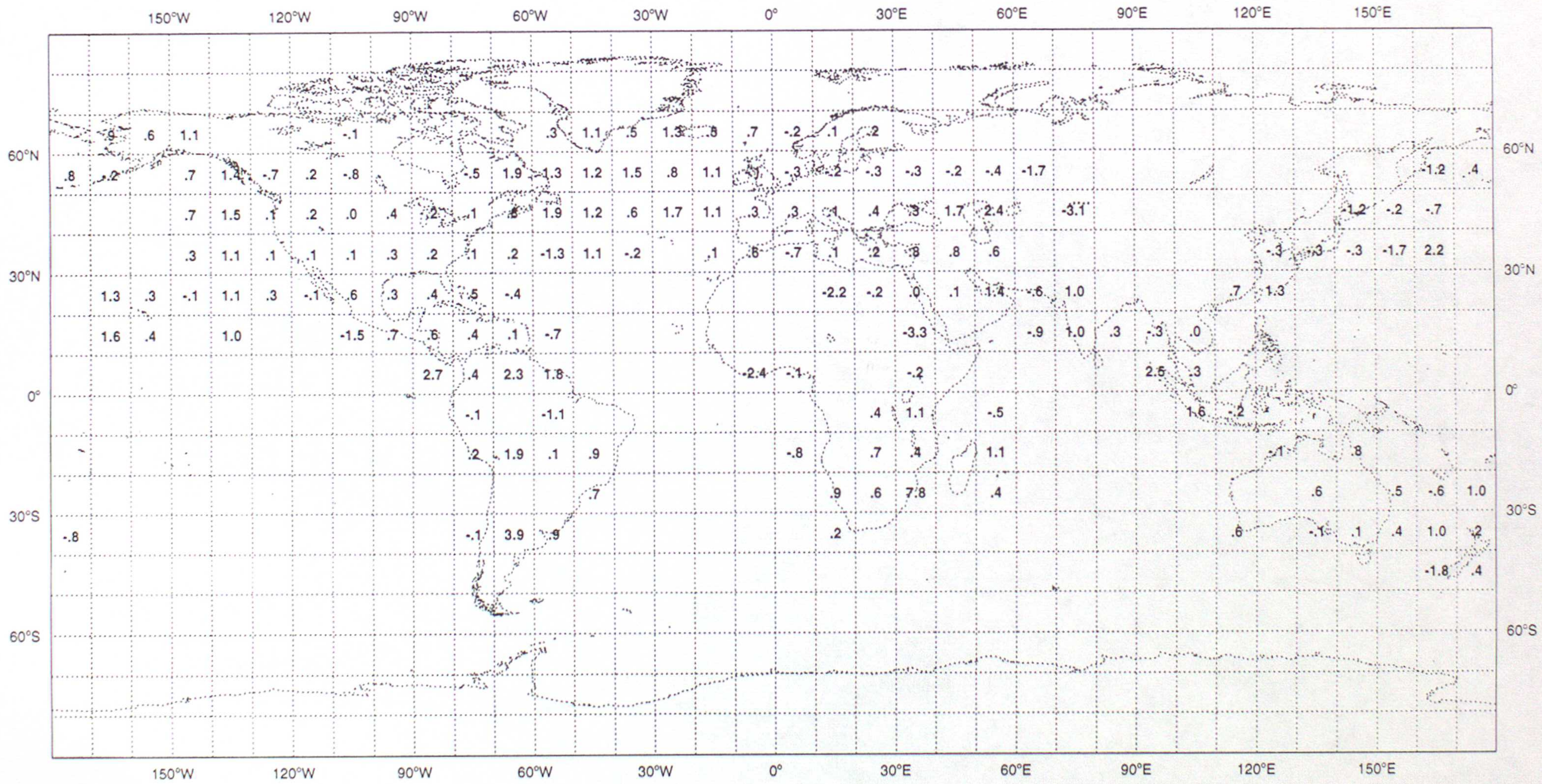

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.9 .6 1.1 -.1 .3 1.1 .5 1.3 .8 .7 -.2 .1 .2
.8 .2 .7 1.4 -.7 .2 -.8 -.5 1.9 -1.3 1.2 1.5 .8 1.1 .1 -.3 -.2 -.3 -.3 -.2 -.4 -1.7 -1.2 .4
.7 1.5 .1 .2 .0 .4 .2 .1 .8 1.9 1.2 .6 1.7 1.1 .3 .3 .1 .4 .3 1.7 2.4 -3.1 -1.2 -.2 -.7
.3 1.1 .1 .1 .1 .3 .2 .1 .2 -1.3 1.1 -.2 .1 .6 -.7 .1 .2 .8 .8 .6 -.3 -.3 -.3 -1.7 2.2
1.3 .3 -.1 1.1 .3 -.1 .6 .3 .4 .5 -.4 -2.2 -.2 .0 .1 1.4 -.6 1.0 .7 1.3
1.6 .4 1.0 -1.5 .7 .6 .4 .1 -.7 -3.3 -.9 1.0 .3 -.3 .0
2.7 .4 2.3 1.8 -2.4 -.1 -.2 2.5 .3
-.1 -1.1 .4 1.1 -.5 1.6 -.2
.2 1.9 .1 .9 -.8 .7 .4 1.1 -.1 .8
.7 .9 .6 7.8 .4 .6 .5 -.6 1.0
-.8 -.1 3.9 .9 .2 .6 -.1 .1 .4 1.0 .2
-1.8 .4

Figure 7a. AIRCRAFT 300 - 150 hPa RMS O-B vector (ms-1). MARCH 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

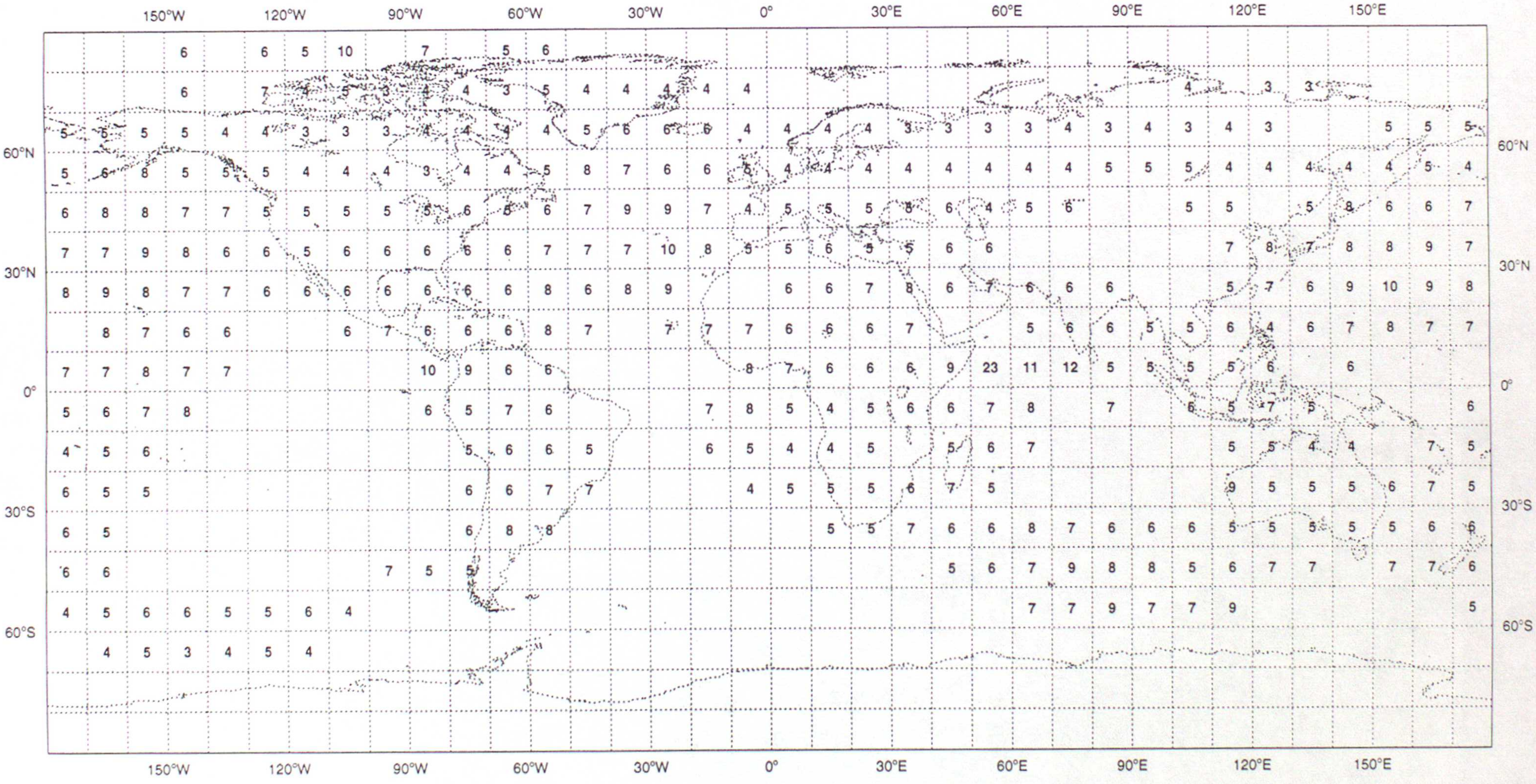

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 7b. AIRCRAFT 1000 - 301 hPa RMS O-B vector (ms-1). MARCH 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

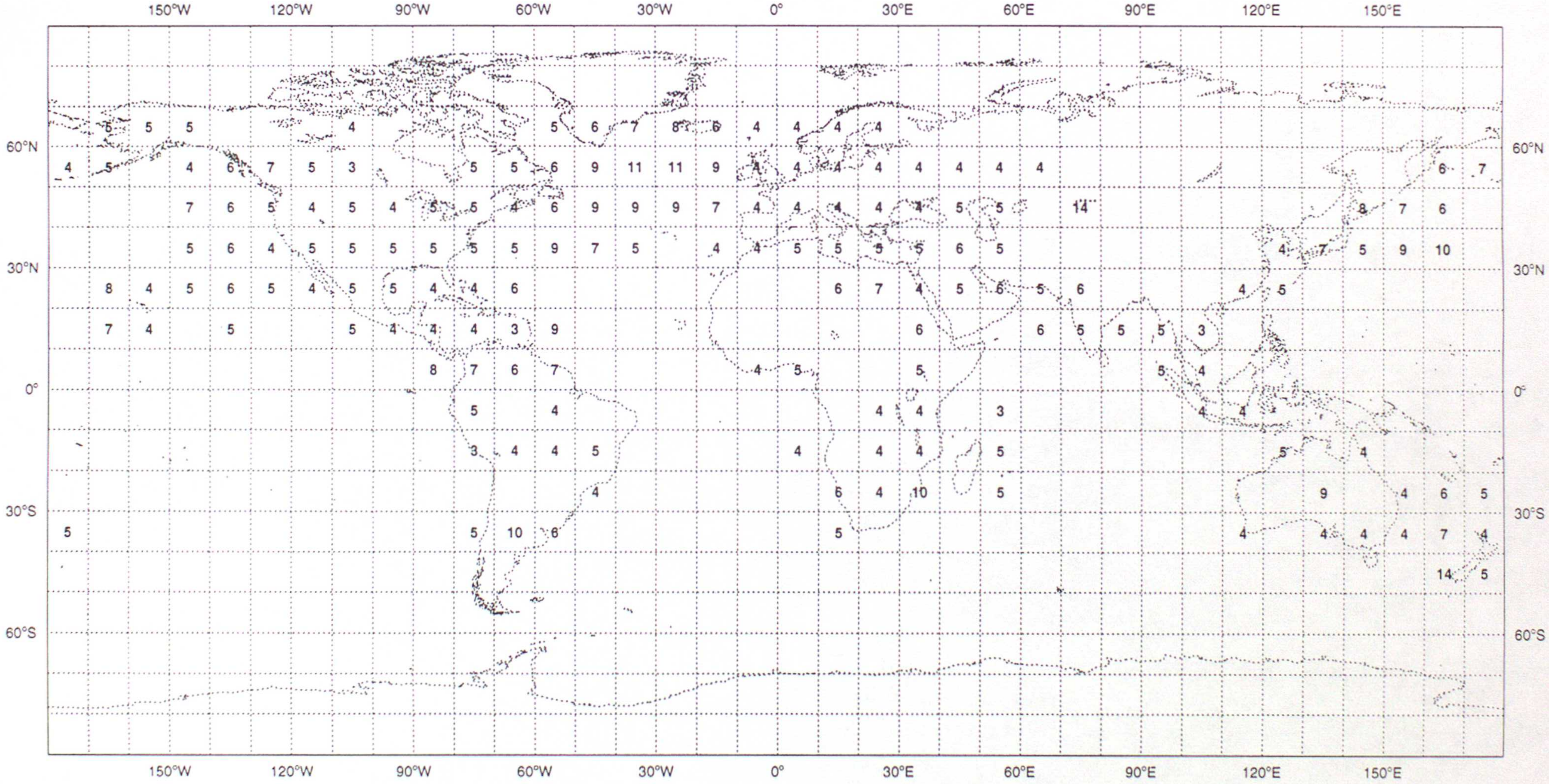

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
5 5 5 4 5 6 7 8 6 4 4 4 4
4 5 4 6 7 5 3 5 5 6 9 11 11 9 4 4 4 4 4 4 4 4 6 7
7 6 5 4 5 4 5 5 4 6 9 9 9 7 4 4 4 4 4 5 5 14 8 7 6
5 6 4 5 5 5 5 5 5 9 7 5 4 4 5 5 5 5 6 5 4 7 5 9 10
8 4 5 6 5 4 5 5 4 4 6 6 7 4 5 6 5 6 4 5
7 4 5 5 4 4 4 3 9 6 6 5 5 5 3
8 7 6 7 4 5 5 5 4
5 4 4 4 3 4 4
3 4 4 5 4 4 4 5 5 4
4 6 4 10 5 9 4 6 5
5 5 10 6 5 4 4 4 4 7 4
14 5

TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: March 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 30.0 hPa
Element monitored		:GEOPOTENTIAL HEIGHT IN metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown duringperiod.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.1	
SELECTION CRITERIA	: ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS.	

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
20674	12	Z	50	73/ 80	12	4	101.5	284.2	301.8	8
26477	12	Z	200	56/ 31	15	0	50.1	100.5	112.3	5
32098	00	Z	200	49/ 143	28	0	39.3	100.5	107.9	5
33837	00	Z	70	46/ 31	19	1	143.6	26.2	146.0	6
34247	12	Z	50	50/ 41	26	2	54.6	186.4	194.2	8
40430	12	Z	30	25/ 40	17	2	26.7	230.1	231.7	4
40437	12	Z	30	25/ 47	17	1	51.6	219.2	225.2	4
41112	12	Z	1000	18/ 43	19	1	18.4	-56.0	58.9	5
42101	00	Z	150	30/ 76	26	0	40.6	-83.0	92.4	4
42182	00	Z	30	29/ 77	10	0	88.2	185.3	205.2	4
42339	00	Z	100	26/ 73	13	1	120.6	27.6	123.8	5
42339	12	Z	150	26/ 73	16	3	122.2	-50.8	132.3	7
42361	12	Z	200	26/ 78	11	0	76.0	-92.6	119.8	4
42379	12	Z	400	27/ 83	10	0	37.7	45.6	59.1	5
42397	00	Z	200	27/ 88	17	0	50.3	-103.5	115.1	5
42647	00	Z	70	23/ 73	11	0	116.5	-123.5	169.7	5
42647	12	Z	50	23/ 73	8	5	174.9	246.5	302.3	9
42667	00	Z	150	23/ 77	10	0	82.1	-111.1	138.2	4
42701	00	Z	250	23/ 85	20	0	80.7	-38.8	89.5	7
42724	00	Z	150	24/ 91	21	0	72.1	-82.4	109.5	4
42724	12	Z	150	24/ 91	19	0	52.8	-121.4	132.4	5
42867	00	Z	30	21/ 79	17	0	105.6	182.3	210.7	4
43003	00	Z	150	19/ 73	20	0	61.9	-94.5	113.0	4
43003	12	Z	250	19/ 73	23	0	71.4	58.9	92.6	8
43128	00	Z	150	17/ 78	26	2	68.1	-110.2	129.5	7
43185	12	Z	70	16/ 81	12	0	73.9	138.9	157.4	8
43192	00	Z	100	15/ 74	12	1	95.7	-168.9	194.1	7
43279	00	Z	30	13/ 80	13	0	162.3	171.2	236.0	6
43311	00	Z	150	11/ 73	11	0	109.6	0.8	109.6	4
43346	00	Z	100	11/ 80	26	0	98.5	-131.8	164.5	5
43369	00	Z	150	8/ 73	18	1	58.1	-128.8	141.3	7
43369	12	Z	50	8/ 73	14	3	164.0	229.3	281.9	10
43371	00	Z	100	8/ 77	27	2	86.4	-154.3	176.8	6
82332	12	Z	50	-3/ -60	6	0	13.5	186.7	187.2	4
82599	12	Z	50	-6/ -35	1	0	0.0	164.0	164.0	9
83746	12	Z	50	-23/ -43	4	0	20.0	163.0	164.2	4
83840	12	Z	30	-26/ -49	2	0	6.0	204.0	204.1	4
83971	12	Z	100	-30/ -51	1	0	0.0	237.0	237.0	8
91366	00	Z	50	9/ 168	30	0	89.6	190.9	210.9	4
96935	00	Z	400	-7/ 113	9	0	68.6	-11.0	69.5	4

Figure 8. TEMP 500 hPa geopotential mean daily count. MARCH 2002

All hours

Global average number of observations in 24 hours = 1151

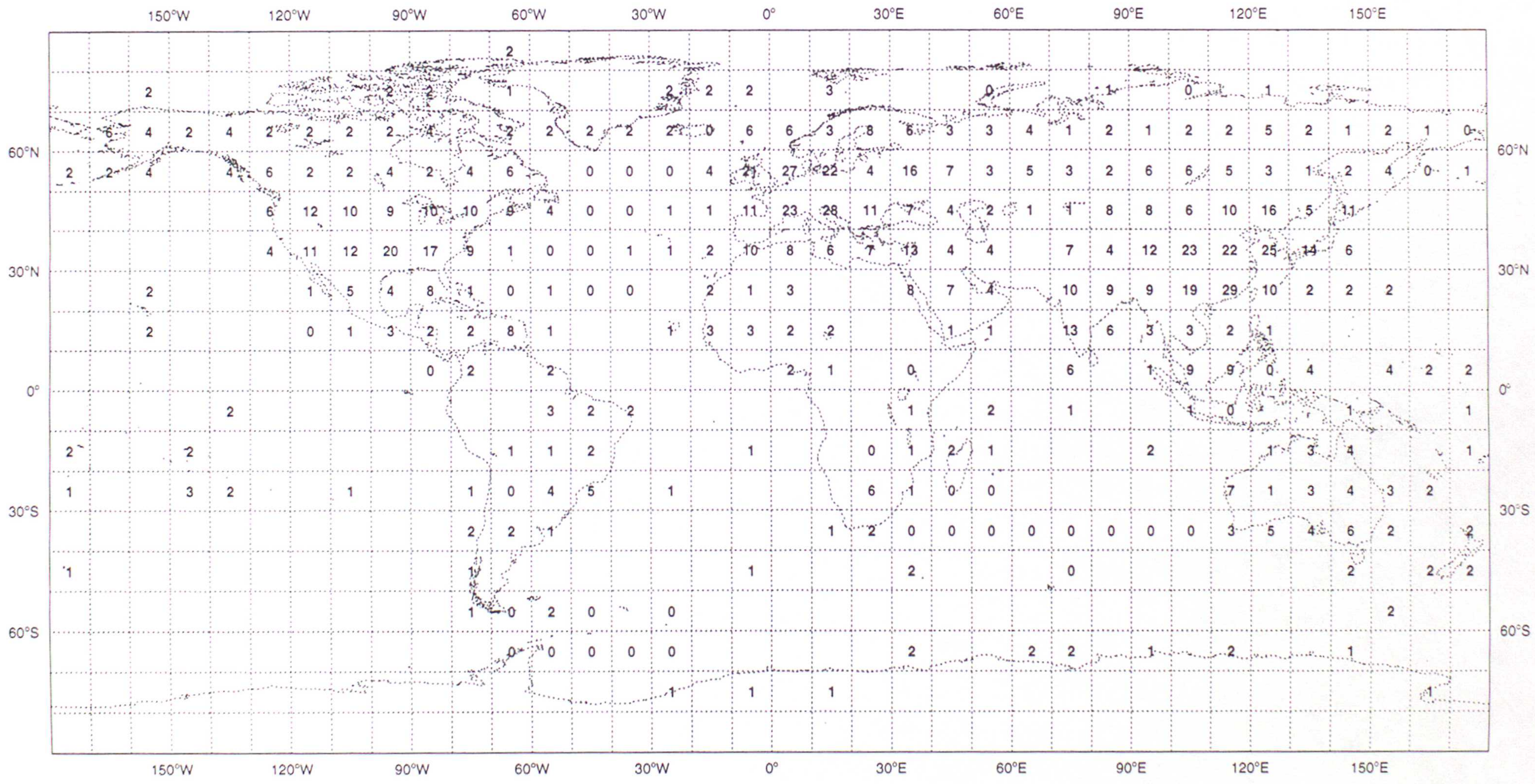

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
2
2 2 2 1 2 2 2 3 0 1 0 1
6 4 2 4 2 2 2 2 4 2 2 2 2 2 0 6 6 3 8 6 3 3 4 1 2 1 2 2 5 2 1 2 1 0
2 2 4 4 6 2 2 4 2 4 6 0 0 0 4 21 27 22 4 16 7 3 5 3 2 6 6 5 3 1 2 4 0 1
6 12 10 9 10 10 9 4 0 0 1 1 11 23 28 11 7 4 2 1 1 8 8 6 10 16 5 11
4 11 12 20 17 9 1 0 0 1 1 2 10 8 6 7 13 4 4 7 4 12 23 22 25 14 6
2 1 5 4 8 1 0 1 0 0 2 1 3 8 7 4 10 9 9 19 29 10 2 2 2
2 0 1 3 2 2 8 1 1 3 3 2 2 1 1 13 6 3 3 2 1
0 2 2 2 1 0 6 1 9 9 0 4 4 2 2
2 3 2 2 1 2 1 1 1
2 2 1 1 2 1 0 1 2 1 2 1 3 4 1
1 3 2 1 1 0 4 5 1 6 1 0 0 7 1 3 4 3 2
2 2 1 1 2 0 0 0 0 0 0 0 0 3 5 4 6 2 2
1 1 1 2 0 2 2 2
1 0 2 0 0 2
0 0 0 0 0 2 2 2 1 2 1
1 1 1 1

TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: March 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 100.0 hPa

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:% REJ :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

:NUM LEVELS :Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.2

SELECTION CRITERIA : $\geq$ 10 observations and $\geq$ 15 m s^{-1} RMS vector wind.

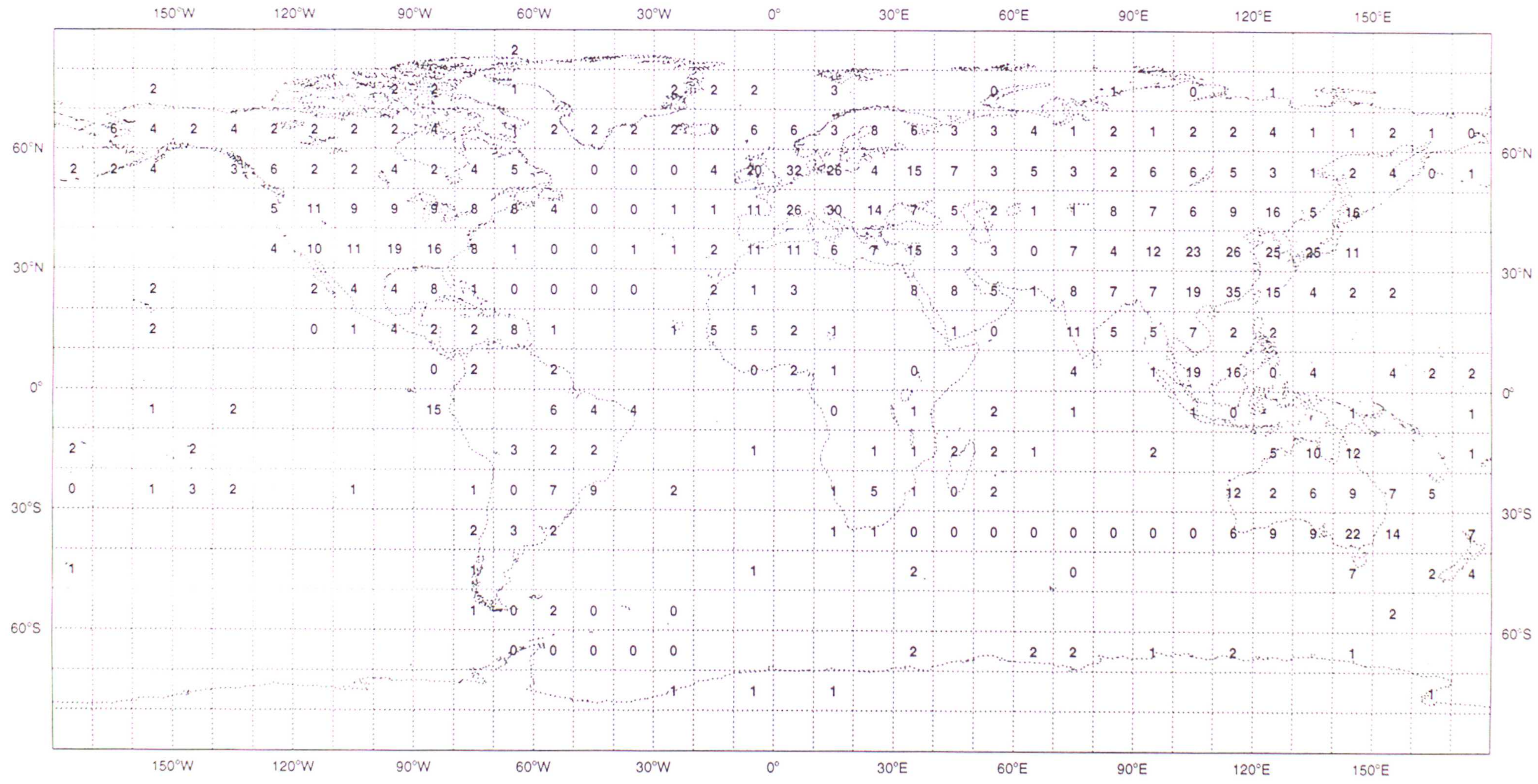
ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
PSPIU	00	V	100	-5/ -81	28	0	100	4.3	1.1	19.9	1
PSPIU	12	V	150	-5/ -81	22	0	100	-0.8	-2.4	19.0	2
38341	00	V	300	43/ 71	15	0	26	-3.5	-10.3	16.6	2
40265	00	V	150	32/ 36	26	0	3	-3.0	0.5	20.2	1
40754	12	V	250	36/ 51	19	0	21	9.0	4.9	19.4	3
41594	12	V	150	32/ 73	16	0	100	1.6	3.4	15.7	1
42182	00	V	200	29/ 77	28	1	100	-13.5	-0.6	17.0	2
42182	12	V	100	29/ 77	13	0	100	-5.0	1.0	18.1	1
42361	12	V	400	26/ 78	11	0	9	7.5	-3.1	16.8	1
42369	00	V	200	27/ 81	20	0	100	-15.1	0.8	19.0	4
42379	12	V	300	27/ 83	11	0	100	-4.7	7.7	15.0	1
42410	00	V	250	26/ 92	12	0	100	2.2	1.5	16.3	1
42410	12	V	400	26/ 92	20	0	100	8.8	2.6	18.6	2
42647	12	V	150	23/ 73	13	0	38	-13.6	3.5	36.5	1
42667	00	V	250	23/ 77	12	0	100	-6.3	15.9	20.5	2
42667	12	V	400	23/ 77	20	0	100	-2.7	12.1	17.7	2
42701	12	V	200	23/ 85	9	1	11	-2.1	-4.1	18.1	1
42724	12	V	250	24/ 91	22	0	100	-7.8	-6.0	17.5	2
56146	00	V	100	32/ 100	10	0	100	10.1	0.6	16.7	1
56691	00	V	150	27/ 104	28	0	100	-0.6	7.0	16.6	2
56691	12	V	100	27/ 104	21	2	100	10.2	3.4	18.2	1
60360	12	V	150	37/ 8	19	1	100	6.6	-3.0	17.4	2
60490	12	V	250	36/ -1	24	0	100	-1.3	2.0	16.3	2
60620	12	V	200	28/ 0	11	1	100	-23.5	-5.5	29.4	5
60656	12	V	250	28/ -8	22	0	100	-13.2	-4.5	19.5	3
60680	00	V	150	23/ 6	30	0	3	-3.8	2.1	15.2	1
61442	12	V	150	18/ -16	26	0	3	-7.5	3.7	23.3	1
62378	12	V	200	30/ 31	25	0	100	-11.4	0.2	15.3	1
68512	12	V	250	-30/ 18	22	0	100	-6.2	0.1	15.0	1
71909	00	V	400	64/ -69	17	0	35	-5.3	-6.7	21.4	2
96935	00	V	150	-7/ 113	10	0	10	2.8	1.6	19.9	1
98223	00	V	150	18/ 121	11	0	90	15.3	9.2	24.3	6

Figure 9. TEMP/PILOT 300 hPa wind mean daily count. MARCH 2002

All hours

Global average number of observations in 24 hours = 1340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60°N 30°N 0° 30°S 60°S
2
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6 4 2 4 2 2 2 2 4 1 2 2 2 2 0 6 6 3 8 6 3 3 4 1 2 1 2 2 4 1 1 2 1 0
2 2 4 3 6 2 2 4 2 4 5 0 0 0 4 20 32 26 4 15 7 3 5 3 2 6 6 5 3 1 2 4 0 1
5 11 9 9 9 8 8 4 0 0 1 1 11 26 30 14 7 5 2 1 1 8 7 6 9 16 5 16
4 10 11 19 16 8 1 0 0 1 1 2 11 11 6 7 15 3 3 0 7 4 12 23 26 25 25 11
2 2 4 4 8 1 0 0 0 0 2 1 3 8 8 5 1 8 7 7 19 35 15 4 2 2
2 0 1 4 2 2 8 1 1 5 5 2 1 1 0 11 5 5 7 2 2
0 2 2 0 2 1 0 4 1 19 16 0 4 4 2 2
1 2 15 6 4 4 0 1 2 1 1 0 1 1 1
2 2 3 2 2 1 1 1 2 2 1 2 5 10 12 1
0 1 3 2 1 1 0 7 9 2 1 5 1 0 2 12 2 6 9 7 5
2 3 2 1 1 0 0 0 0 0 0 0 0 6 9 9 22 14 7
1 1 1 2 0 7 2 4
1 0 2 0 0 2
0 0 0 0 0 2 2 2 1 2 1
1 1 1 1

TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: March 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 500.0 - 150.0 hPa
Element monitored		:WIND DIRECTION in degrees
Parameters monitored		
	:NUM OBS	:Average number of observations at all levels.
	:BIAS	:Mean difference of observations from background values from all levels.
	:MAX SPREAD	:(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels
	:SD	:SD of difference of observations from background values at all levels.

SELECTION CRITERIA

:NUM OBS ≥ 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
29612	12	DD	55/ 78	25	22.6	2.3	6.6
31510	00	DD	51/ 127	25	-10.8	3.9	9.0
42397	12	DD	27/ 88	18	12.5	4.0	9.6
42667	00	DD	23/ 77	14	-23.4	9.1	13.7
48455	00	DD	14/ 101	21	10.0	6.3	19.2
59981	12	DD	17/ 112	27	10.5	3.6	23.3
62337	00	DD	31/ 34	26	-19.3	5.5	11.5
62337	12	DD	31/ 34	25	-19.6	1.6	7.6
96749	00	DD	-6/ 107	10	-10.8	8.0	21.2

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH: March 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from GOES-8, GOES-10, METEOSAT-5, METEOSAT-7, GMS-5, INSAT.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :number of observations > 10.

Data Extracted :Layer 701 - 1000 hPa
401 - 700 hPa
101 - 400 hPa

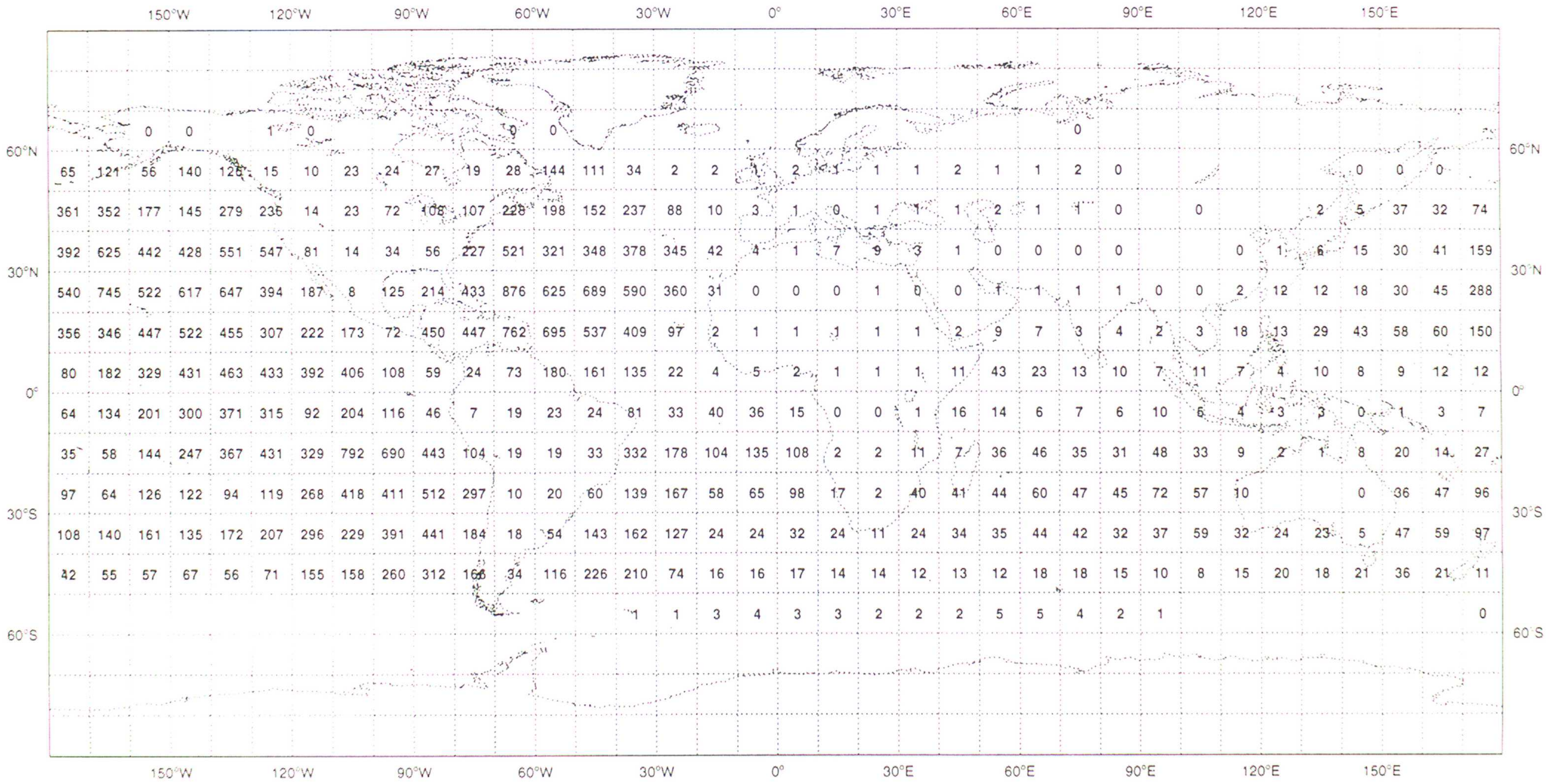
:Mean wind

:Mean observation minus background vector wind differences

:Mean observation minus background speed differences

:RMS of observation minus background vector differences

Figure 10. SATOB 701 - 1000 hPa mean daily count. MARCH 2002
Global average number of observations in 24 hours = 44894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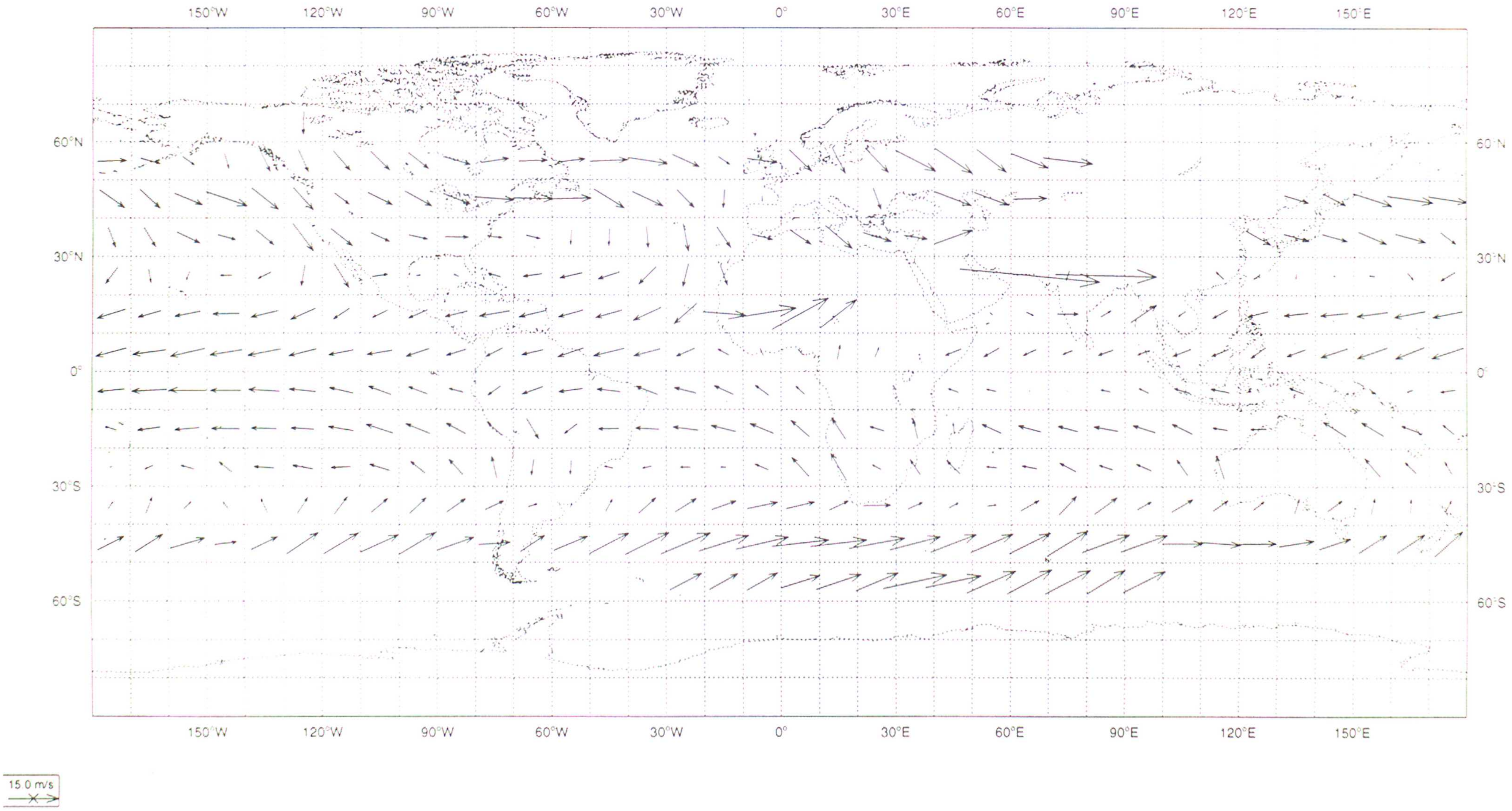
60°N 30°N 0° 30°S 60°S
0 0 1 0 0 0 0
65 121 56 140 126 15 10 23 24 27 19 28 144 111 34 2 2 1 2 1 1 1 2 1 1 2 0 0 0 0
361 352 177 145 279 236 14 23 72 108 107 228 198 152 237 88 10 3 1 0 1 1 1 2 1 1 0 0 2 5 37 32 74
392 625 442 428 551 547 81 14 34 56 227 521 321 348 378 345 42 4 1 7 9 3 1 0 0 0 0 0 1 6 15 30 41 159
540 745 522 617 647 394 187 8 125 214 433 876 625 689 590 360 31 0 0 0 1 0 0 1 1 1 1 0 0 2 12 12 18 30 45 288
356 346 447 522 455 307 222 173 72 450 447 762 695 537 409 97 2 1 1 1 1 1 2 9 7 3 4 2 3 18 13 29 43 58 60 150
80 182 329 431 463 433 392 406 108 59 24 73 180 161 135 22 4 5 2 1 1 1 11 43 23 13 10 7 11 7 4 10 8 9 12 12
64 134 201 300 371 315 92 204 116 46 7 19 23 24 81 33 40 36 15 0 0 1 16 14 6 7 6 10 6 4 3 3 0 1 3 7
35 58 144 247 367 431 329 792 690 443 104 19 19 33 332 178 104 135 108 2 2 11 7 36 46 35 31 48 33 9 2 1 8 20 14 27
97 64 126 122 94 119 268 418 411 512 297 10 20 60 139 167 58 65 98 17 2 40 41 44 60 47 45 72 57 10 0 36 47 96
108 140 161 135 172 207 296 229 391 441 184 18 54 143 162 127 24 24 32 24 11 24 34 35 44 42 32 37 59 32 24 23 5 47 59 97
42 55 57 67 56 71 155 158 260 312 166 34 116 226 210 74 16 16 17 14 14 12 13 12 18 18 15 10 8 15 20 18 21 36 21 11
1 1 3 4 3 3 2 2 2 5 5 4 2 1 0

Figure 11. SATOB 701 - 1000 hPa vector mean wind. MARCH 2002

All observations

Arrows are plotted where greater than 10 obs are present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120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 12. SATOB 701 - 1000 hPa vector wind differences. MARCH 2002
All observations
Arrows are plotted where greater than 10 obs are present

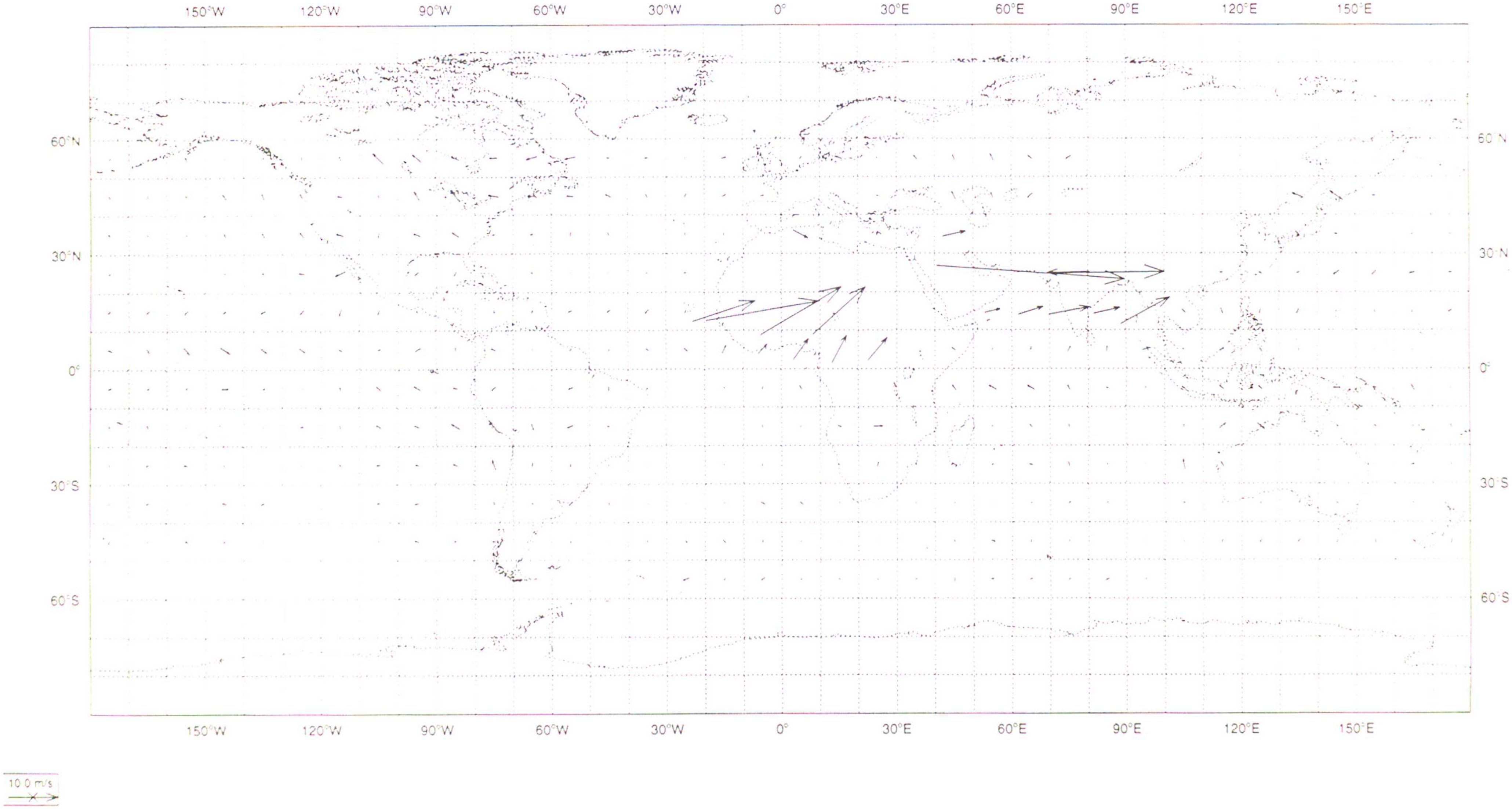
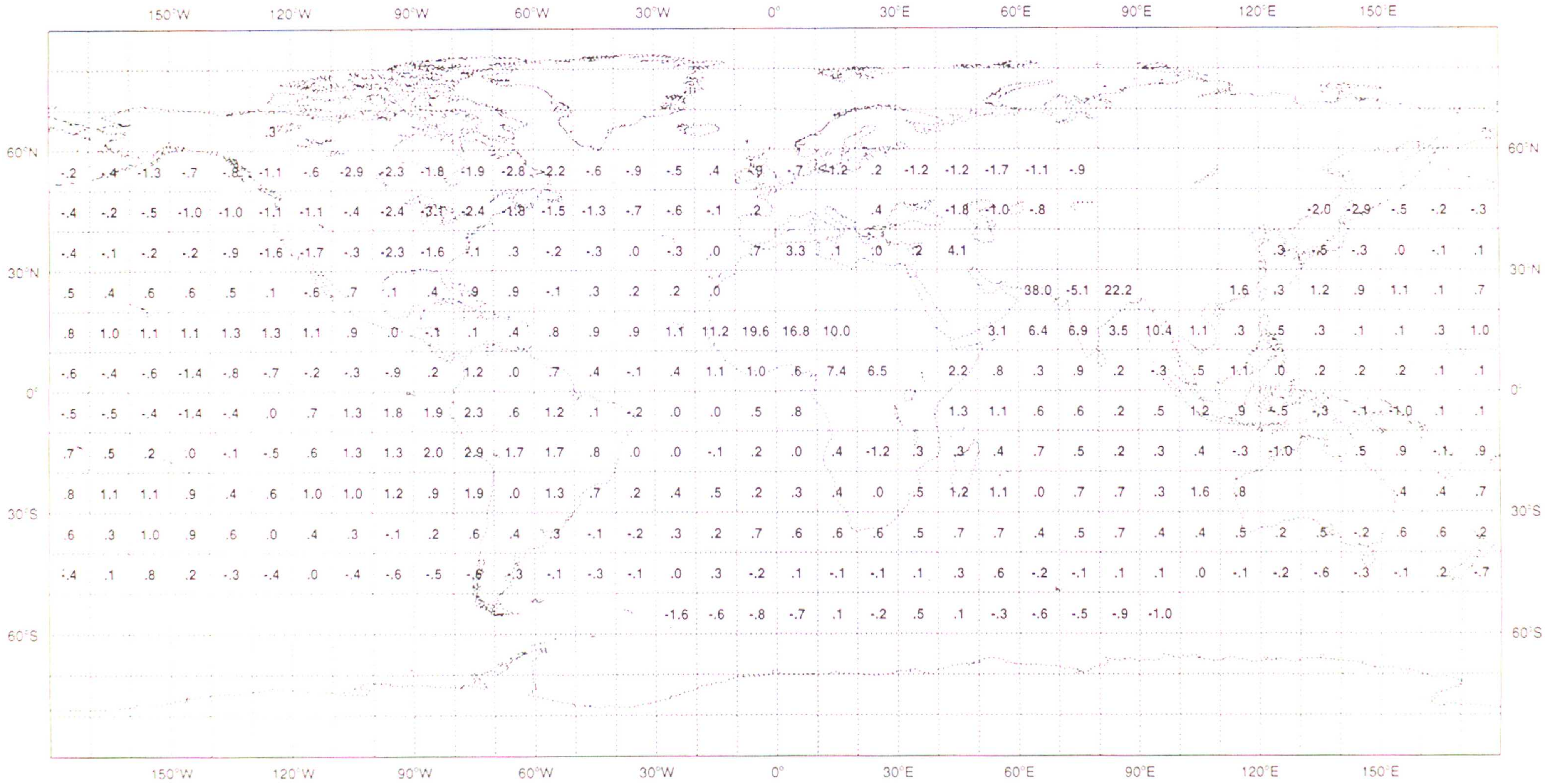

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0 m/s

Figure 13. SATOB 701 - 1000 hPa mean O-B speed differences (ms-1). MARCH 2002

All observations

Values are plotted where greater than 10 obs are present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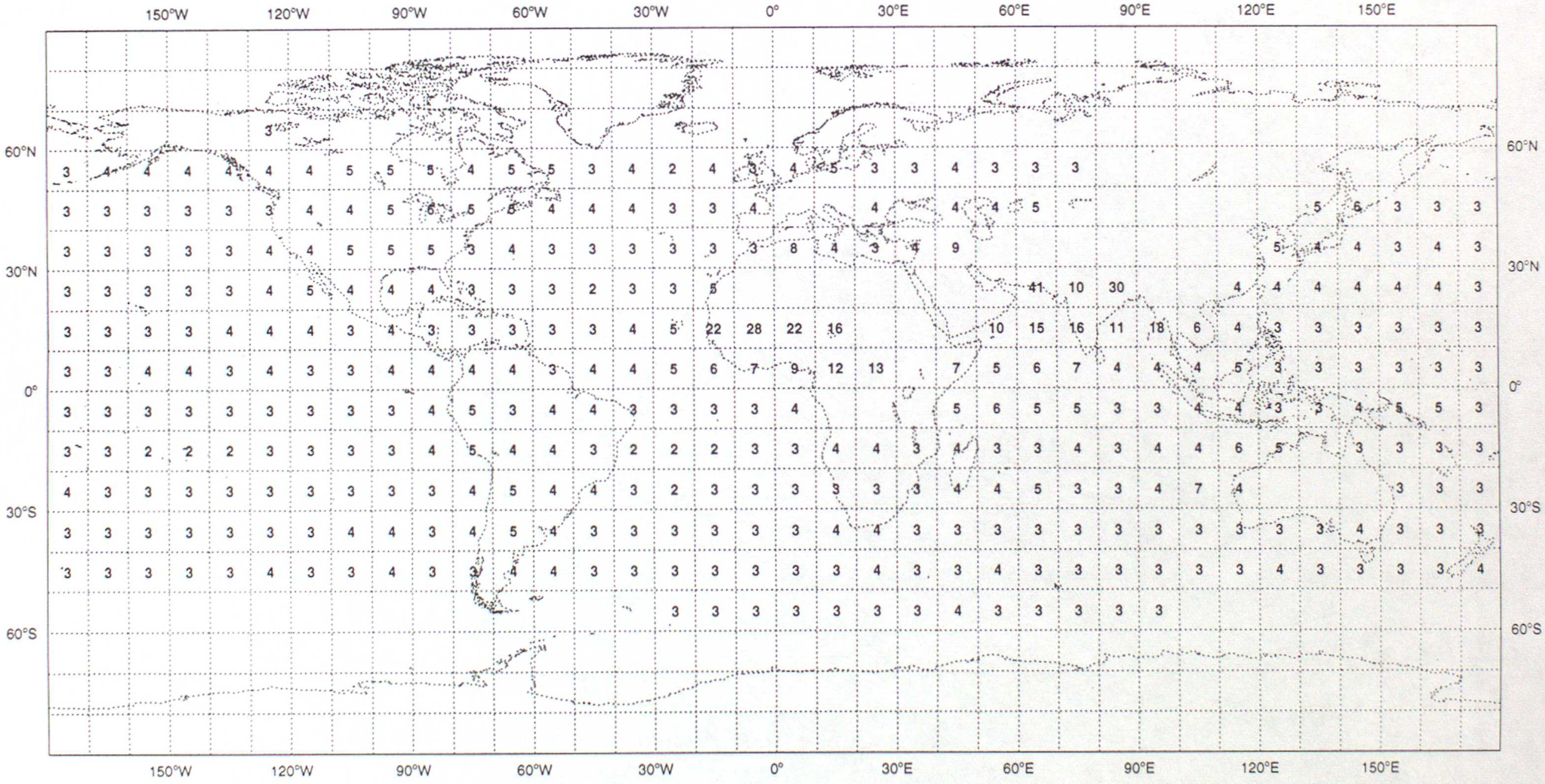
60°N
30°N
0°
30°S
60°S
.3
-.2 .4 -1.3 -.7 .8 -1.1 -.6 -2.9 -2.3 -1.8 -1.9 -2.8 -2.2 -.6 -.9 -.5 .4 .9 -.7 -1.2 .2 -1.2 -1.2 -1.7 -1.1 -.9
-.4 -.2 -.5 -1.0 -1.0 -1.1 -1.1 -.4 -2.4 -3.1 -2.4 -1.8 -1.5 -1.3 -.7 -.6 -.1 .2 .4 -1.8 -1.0 -.8 -2.0 -2.9 -.5 -.2 -.3
-.4 -.1 -.2 -.2 -.9 -1.6 -1.7 -.3 -2.3 -1.6 -.1 .3 -.2 -.3 .0 -.3 .0 .7 3.3 .1 .0 .2 4.1 .3 -.5 -.3 .0 -.1 .1
.5 .4 .6 .6 .5 .1 -.6 .7 .1 .4 .9 .9 -.1 .3 .2 .2 .0 38.0 -5.1 22.2 1.6 .3 1.2 .9 1.1 .1 .7
.8 1.0 1.1 1.1 1.3 1.3 1.1 .9 .0 -.1 .1 .4 .8 .9 .9 1.1 11.2 19.6 16.8 10.0 3.1 6.4 6.9 3.5 10.4 1.1 .3 .5 .3 .1 .1 .3 1.0
-.6 -.4 -.6 -1.4 -.8 -.7 -.2 -.3 -.9 .2 1.2 .0 .7 .4 -.1 .4 1.1 1.0 .6 7.4 6.5 2.2 .8 .3 .9 .2 -.3 .5 1.1 .0 .2 .2 .2 .1 .1
-.5 -.5 -.4 -1.4 -.4 .0 .7 1.3 1.8 1.9 2.3 .6 1.2 .1 -.2 .0 .0 .5 .8 1.3 1.1 .6 .6 .2 .5 1.2 .9 -.5 -.3 -.1 -1.0 .1 .1
.7 .5 .2 .0 -.1 -.5 .6 1.3 1.3 2.0 2.9 1.7 1.7 .8 .0 .0 -.1 .2 .0 .4 -1.2 .3 .3 .4 .7 .5 .2 .3 .4 -.3 -1.0 .5 .9 -.1 .9
.8 1.1 1.1 .9 .4 .6 1.0 1.0 1.2 .9 1.9 .0 1.3 .7 .2 .4 .5 .2 .3 .4 .0 .5 1.2 1.1 .0 .7 .7 .3 1.6 .8 .4 .4 .7
.6 .3 1.0 .9 .6 .0 .4 .3 -.1 .2 .6 .4 .3 -.1 -.2 .3 .2 .7 .6 .6 .6 .5 .7 .7 .4 .5 .7 .4 .4 .5 .2 .5 -.2 .6 .6 .2
-.4 .1 .8 .2 -.3 -.4 .0 -.4 -.6 -.5 -.6 -.3 -.1 -.3 -.1 .0 .3 -.2 .1 -.1 -.1 .1 .3 .6 -.2 -.1 .1 .1 .0 -.1 -.2 -.6 -.3 -.1 .2 -.7
-1.6 -.6 -.8 -.7 .1 -.2 .5 .1 -.3 -.6 -.5 -.9 -1.0

Figure 14. SATOB 701 - 1000 hPa RMS O-B vector differences (ms-1). MARCH 2002

All observations

Values are plotted where greater than 10 obs are present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120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 15. SATOB 401 - 700 hPa mean daily count. MARCH 2002
Global average number of observations in 24 hours = 12029

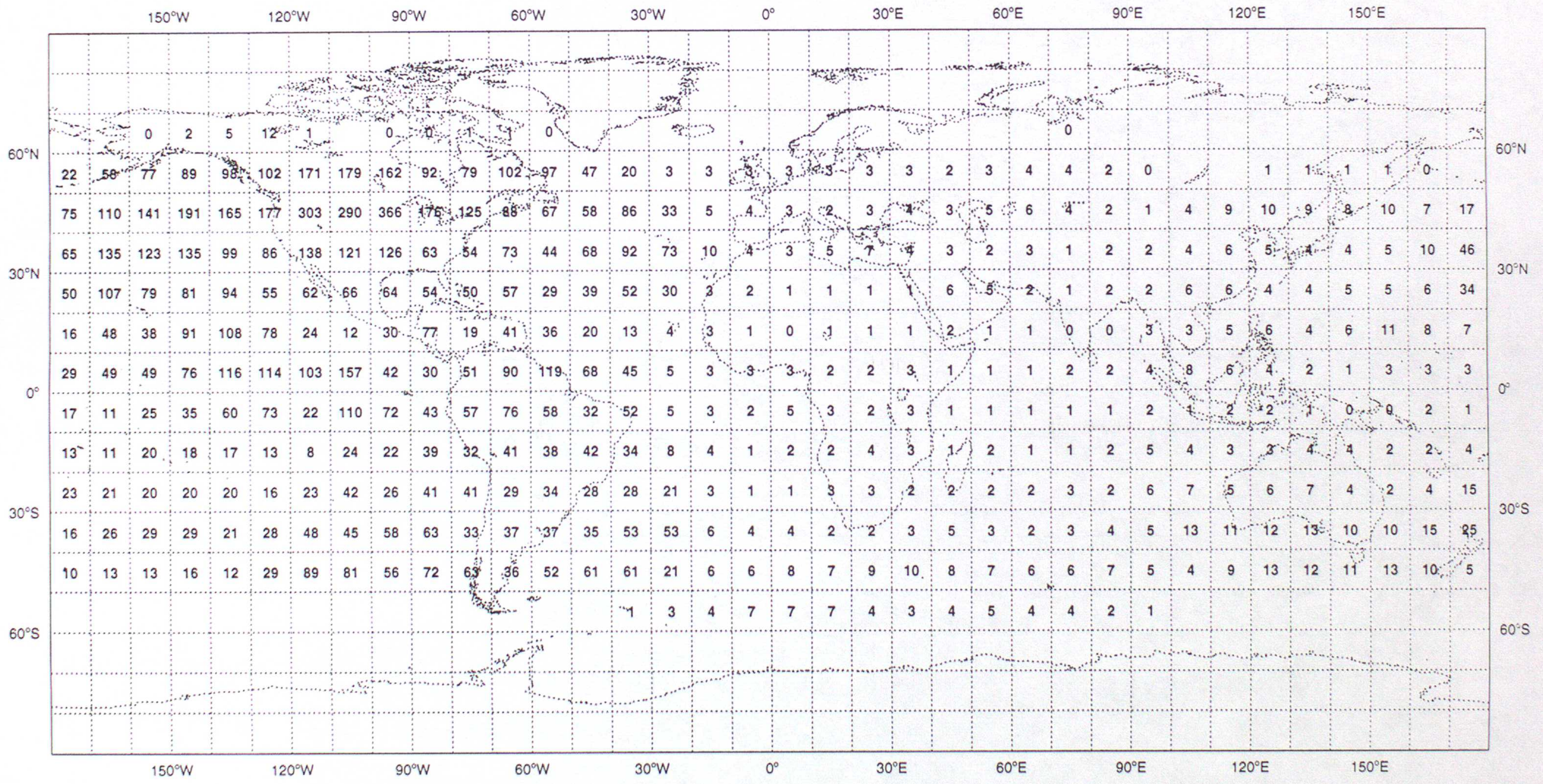
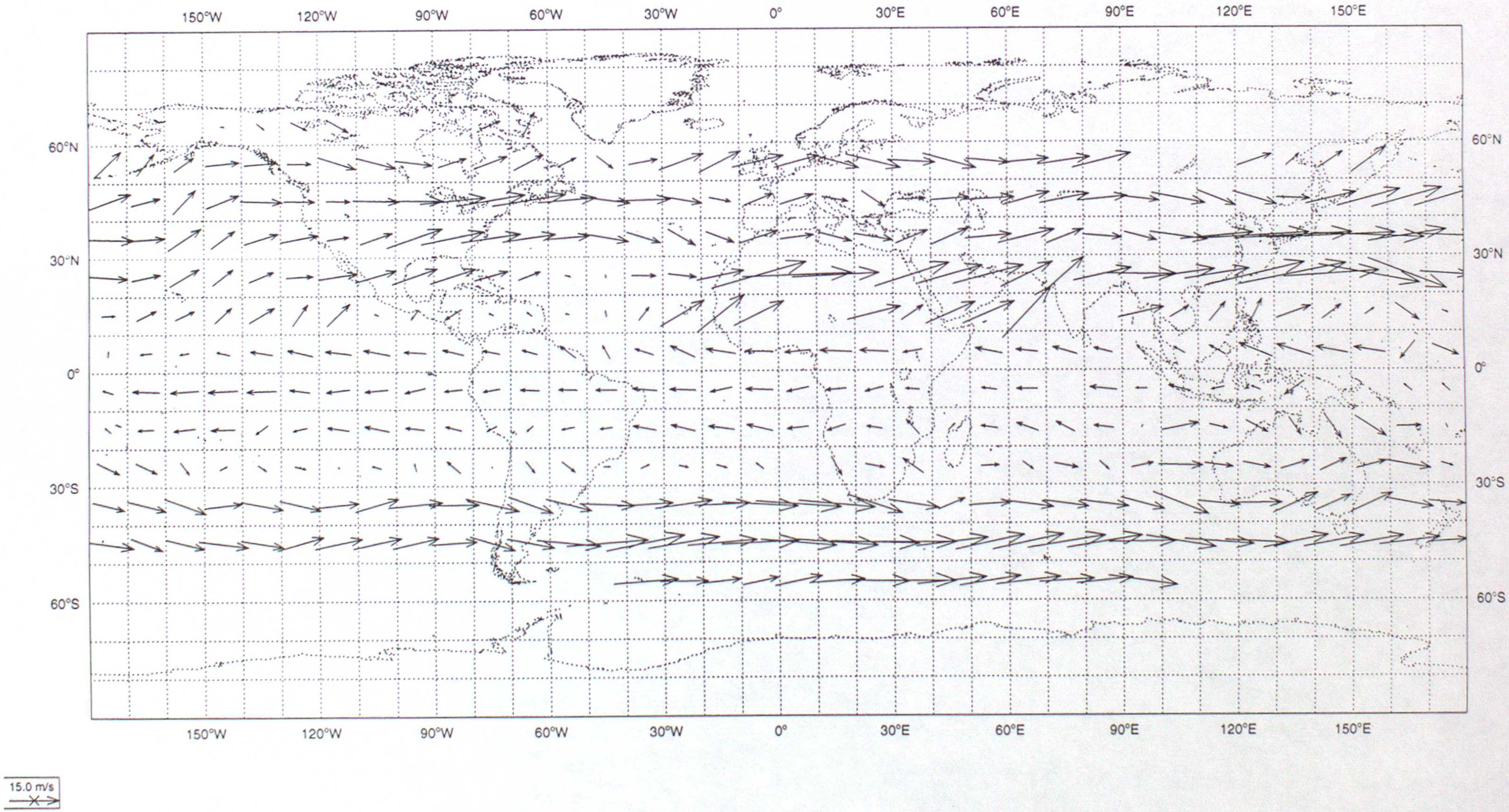

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
0 2 5 12 1 0 0 1 1 0 0
22 58 77 89 98 102 171 179 162 92 79 102 97 47 20 3 3 3 3 3 3 3 2 3 4 4 2 0 1 1 1 1 0
75 110 141 191 165 177 303 290 366 176 125 88 67 58 86 33 5 4 3 2 3 4 3 5 6 4 2 1 4 9 10 9 8 10 7 17
65 135 123 135 99 86 138 121 126 63 54 73 44 68 92 73 10 4 3 5 7 4 3 2 3 1 2 2 4 6 5 4 4 5 10 46
50 107 79 81 94 55 62 66 64 54 50 57 29 39 52 30 3 2 1 1 1 1 6 5 2 1 2 2 6 6 4 4 5 5 6 34
16 48 38 91 108 78 24 12 30 77 19 41 36 20 13 4 3 1 0 1 1 1 2 1 1 0 0 3 3 5 6 4 6 11 8 7
29 49 49 76 116 114 103 157 42 30 51 90 119 68 45 5 3 3 3 2 2 3 1 1 1 2 2 4 8 6 4 2 1 3 3 3
17 11 25 35 60 73 22 110 72 43 57 76 58 32 52 5 3 2 5 3 2 3 1 1 1 1 1 2 1 2 2 1 0 0 2 1
13 11 20 18 17 13 8 24 22 39 32 41 38 42 34 8 4 1 2 2 4 3 1 2 1 1 2 5 4 3 3 4 4 2 2 4
23 21 20 20 20 16 23 42 26 41 41 29 34 28 28 21 3 1 1 3 3 2 2 2 2 3 2 6 7 5 6 7 4 2 4 15
16 26 29 29 21 28 48 45 58 63 33 37 37 35 53 53 6 4 4 2 2 3 5 3 2 3 4 5 13 11 12 13 10 10 15 25
10 13 13 16 12 29 89 81 56 72 63 36 52 61 61 21 6 6 8 7 9 10 8 7 6 6 7 5 4 9 13 12 11 13 10 5
1 3 4 7 7 7 4 3 4 5 4 4 2 1

Figure 16. SATOB 401 - 700 hPa vector mean wind. MARCH 2002
All observations
Arrows are plotted where greater than 10 obs are present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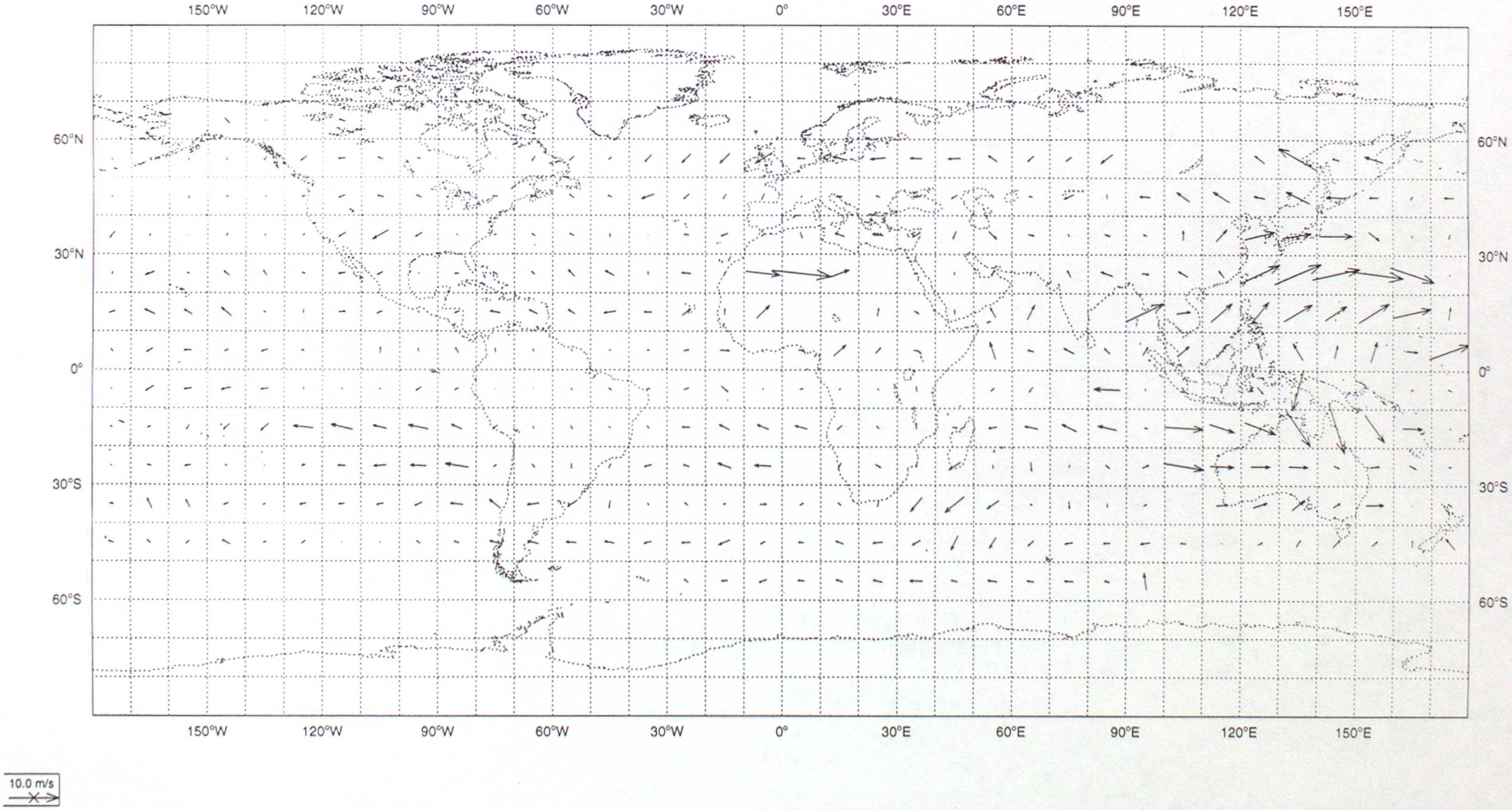
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 17. SATOB 401 - 700 hPa vector wind differences. MARCH 2002

All observations

Arrows are plotted where greater than 10 obs are present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120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0 m/s

Figure 18. SATOB 401 - 700 hPa mean O-B speed differences (ms-1). MARCH 2002

All observations

Values are plotted where greater than 10 obs are present

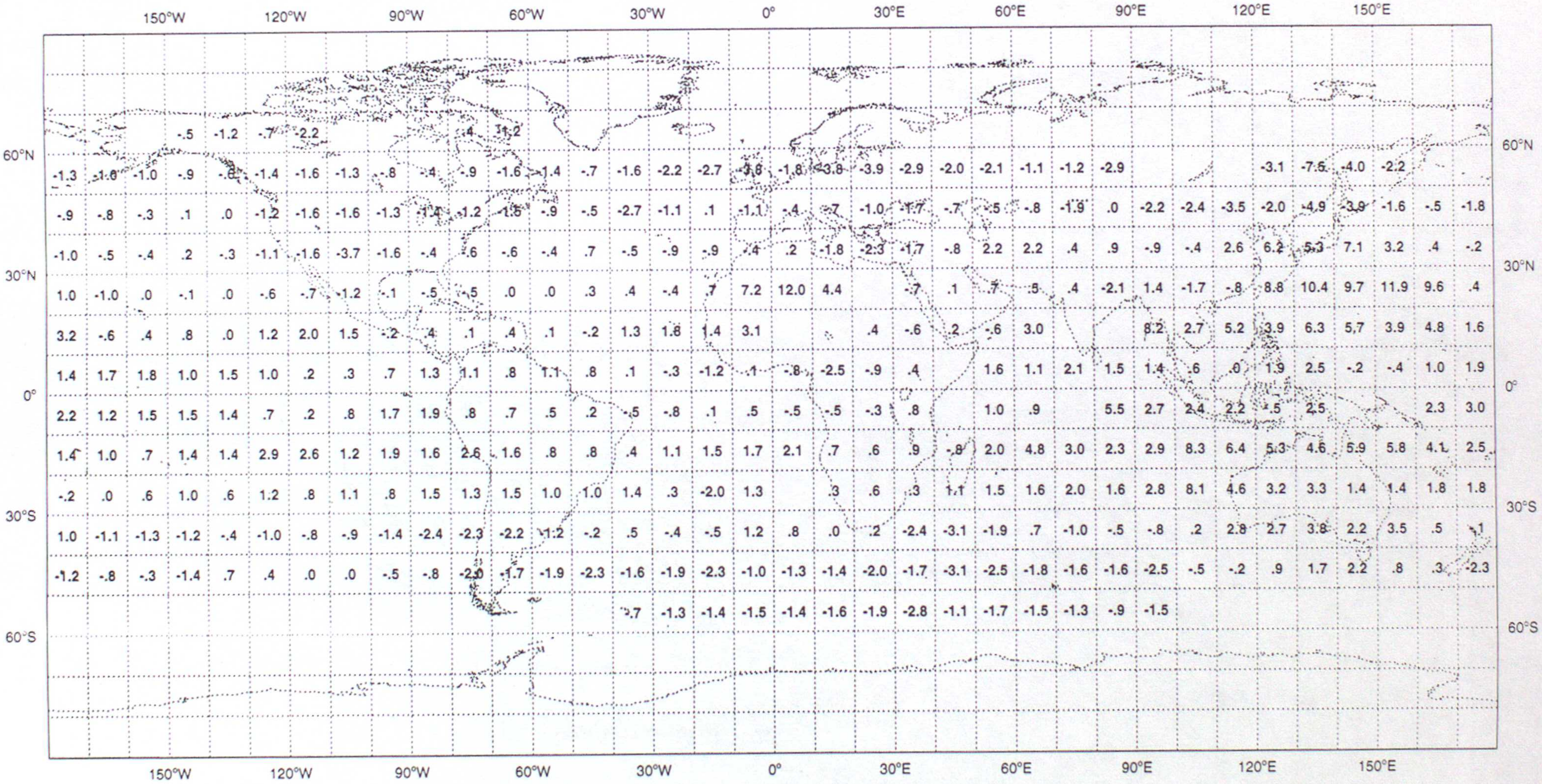
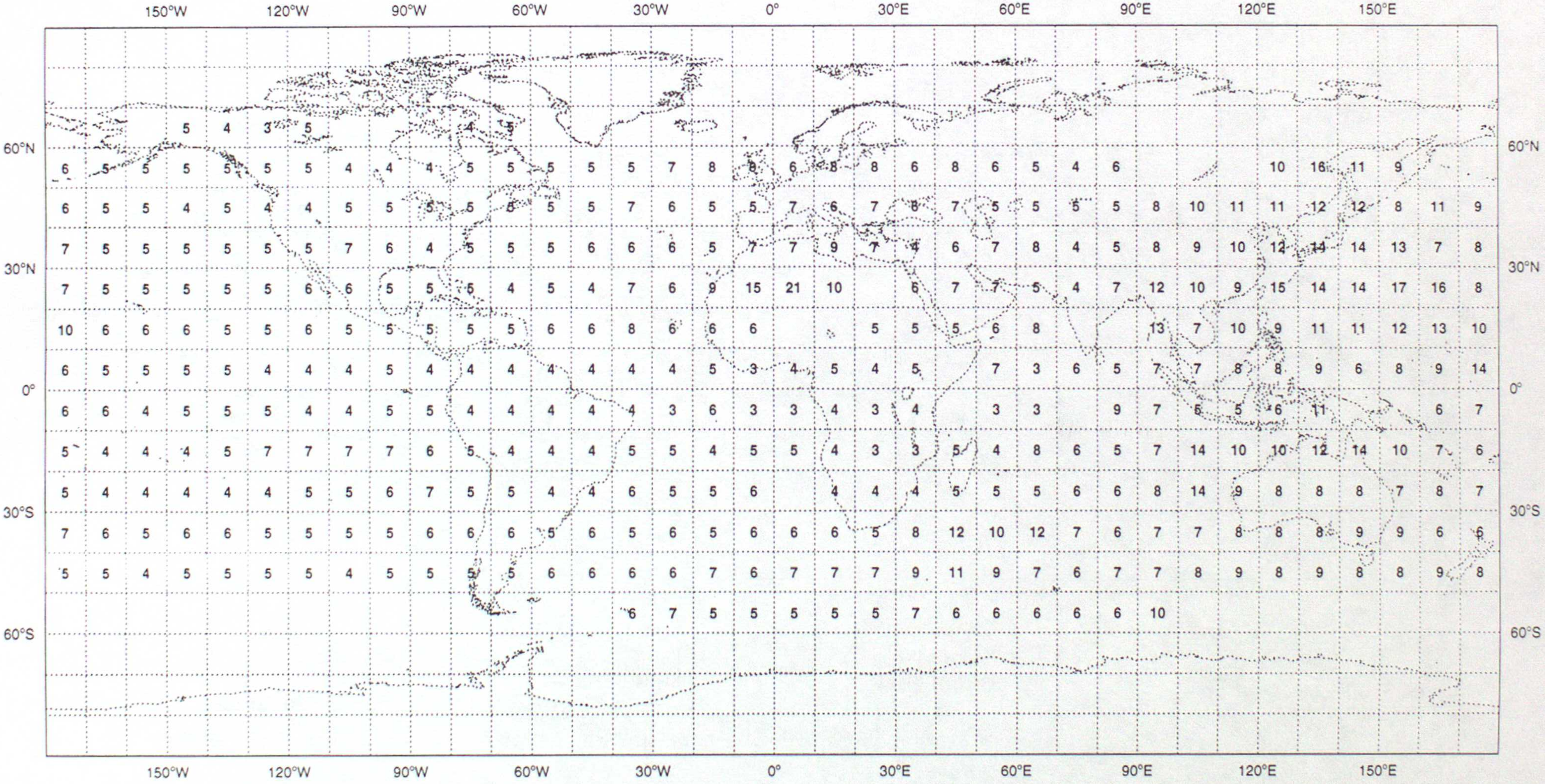

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-.5 -1.2 -.7 -2.2 .4 1.2
-1.3 -1.6 -1.0 -.9 -.8 -1.4 -1.6 -1.3 -.8 .4 -.9 -1.6 -1.4 -.7 -1.6 -2.2 -2.7 -3.8 -1.8 -3.8 -3.9 -2.9 -2.0 -2.1 -1.1 -1.2 -2.9 -3.1 -7.5 -4.0 -2.2
-.9 -.8 -.3 .1 .0 -1.2 -1.6 -1.6 -1.3 -1.4 -1.2 -1.5 -.9 -.5 -2.7 -1.1 .1 -1.1 .4 -.7 -1.0 -1.7 -.7 -.5 -.8 -1.9 .0 -2.2 -2.4 -3.5 -2.0 -4.9 -3.9 -1.6 -.5 -1.8
-1.0 -.5 -.4 .2 -.3 -1.1 -1.6 -3.7 -1.6 -.4 .6 -.6 -.4 .7 -.5 -.9 -.9 .4 .2 -1.8 -2.3 -1.7 -.8 2.2 2.2 .4 .9 -.9 -.4 2.6 6.2 5.3 7.1 3.2 .4 -.2
1.0 -1.0 .0 -.1 .0 -.6 -.7 -1.2 -.1 -.5 -.5 .0 .0 .3 .4 -.4 .7 7.2 12.0 4.4 -.7 .1 .7 .5 .4 -2.1 1.4 -1.7 -.8 8.8 10.4 9.7 11.9 9.6 .4
3.2 -.6 .4 .8 .0 1.2 2.0 1.5 -.2 .4 .1 .4 .1 -.2 1.3 1.8 1.4 3.1 .4 -.6 .2 -.6 3.0 8.2 2.7 5.2 3.9 6.3 5.7 3.9 4.8 1.6
1.4 1.7 1.8 1.0 1.5 1.0 .2 .3 .7 1.3 1.1 .8 1.1 .8 .1 -.3 -1.2 .1 -.8 -2.5 -.9 .4 1.6 1.1 2.1 1.5 1.4 .6 .0 1.9 2.5 -.2 -.4 1.0 1.9
2.2 1.2 1.5 1.5 1.4 .7 .2 .8 1.7 1.9 .8 .7 .5 .2 .5 -.8 .1 .5 -.5 -.5 -.3 .8 1.0 .9 5.5 2.7 2.4 2.2 .5 2.5 2.3 3.0
1.4 1.0 .7 1.4 1.4 2.9 2.6 1.2 1.9 1.6 2.6 1.6 .8 .8 .4 1.1 1.5 1.7 2.1 .7 .6 .9 -.8 2.0 4.8 3.0 2.3 2.9 8.3 6.4 5.3 4.6 5.9 5.8 4.1 2.5
-.2 .0 .6 1.0 .6 1.2 .8 1.1 .8 1.5 1.3 1.5 1.0 1.0 1.4 .3 -2.0 1.3 .3 .6 .3 1.1 1.5 1.6 2.0 1.6 2.8 8.1 4.6 3.2 3.3 1.4 1.4 1.8 1.8
1.0 -1.1 -1.3 -1.2 -.4 -1.0 -.8 -.9 -1.4 -2.4 -2.3 -2.2 -1.2 -.2 .5 -.4 -.5 1.2 .8 .0 .2 -2.4 -3.1 -1.9 .7 -1.0 -.5 -.8 .2 2.8 2.7 3.8 2.2 3.5 .5 .1
-1.2 -.8 -.3 -1.4 .7 .4 .0 .0 -.5 -.8 -2.0 -1.7 -1.9 -2.3 -1.6 -1.9 -2.3 -1.0 -1.3 -1.4 -2.0 -1.7 -3.1 -2.5 -1.8 -1.6 -1.6 -2.5 -.5 -.2 .9 1.7 2.2 .8 .3 -2.3
.7 -1.3 -1.4 -1.5 -1.4 -1.6 -1.9 -2.8 -1.1 -1.7 -1.5 -1.3 -.9 -1.5

Figure 19. SATOB 401 - 700 hPa RMS O-B vector differences (ms-1). MARCH 2002

All observations

Values are plotted where greater than 10 obs are present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90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
5 4 3 5 4 5
6 5 5 5 5 5 5 4 4 4 5 5 5 5 5 7 8 8 6 8 8 6 8 6 5 4 6 10 16 11 9
6 5 5 4 5 4 4 5 5 5 5 5 5 5 7 6 5 5 7 6 7 8 7 5 5 5 5 8 10 11 11 12 12 8 11 9
7 5 5 5 5 5 5 7 6 4 5 5 5 6 6 6 5 7 7 9 7 4 6 7 8 4 5 8 9 10 12 14 14 13 7 8
7 5 5 5 5 5 6 6 5 5 5 4 5 4 7 6 9 15 21 10 6 7 7 5 4 7 12 10 9 15 14 14 17 16 8
10 6 6 6 5 5 6 5 5 5 5 5 6 6 8 6 6 6 5 5 5 6 8 13 7 10 9 11 11 12 13 10
6 5 5 5 5 4 4 4 5 4 4 4 4 4 4 4 5 3 4 5 4 5 7 3 6 5 7 7 8 8 9 6 8 9 14
6 6 4 5 5 5 4 4 5 5 4 4 4 4 4 3 6 3 3 4 3 4 3 3 9 7 6 5 6 11 6 7
5 4 4 4 5 7 7 7 7 6 5 4 4 4 5 5 4 5 5 4 3 3 5 4 8 6 5 7 14 10 10 12 14 10 7 6
5 4 4 4 4 4 5 5 6 7 5 5 4 4 6 5 5 6 4 4 4 5 5 5 6 6 8 14 9 8 8 8 7 8 7
7 6 5 6 6 5 5 5 5 6 6 6 5 6 5 6 5 6 6 6 5 8 12 10 12 7 6 7 7 8 8 8 9 9 6 6
5 5 4 5 5 5 5 4 5 5 5 5 6 6 6 6 7 6 7 7 7 9 11 9 7 6 7 7 8 9 8 9 8 8 9 8
6 7 5 5 5 5 5 7 6 6 6 6 6 10

Figure 20. SATOB 101 - 400 hPa mean daily count. MARCH 2002
Global average number of observations in 24 hours = 61302

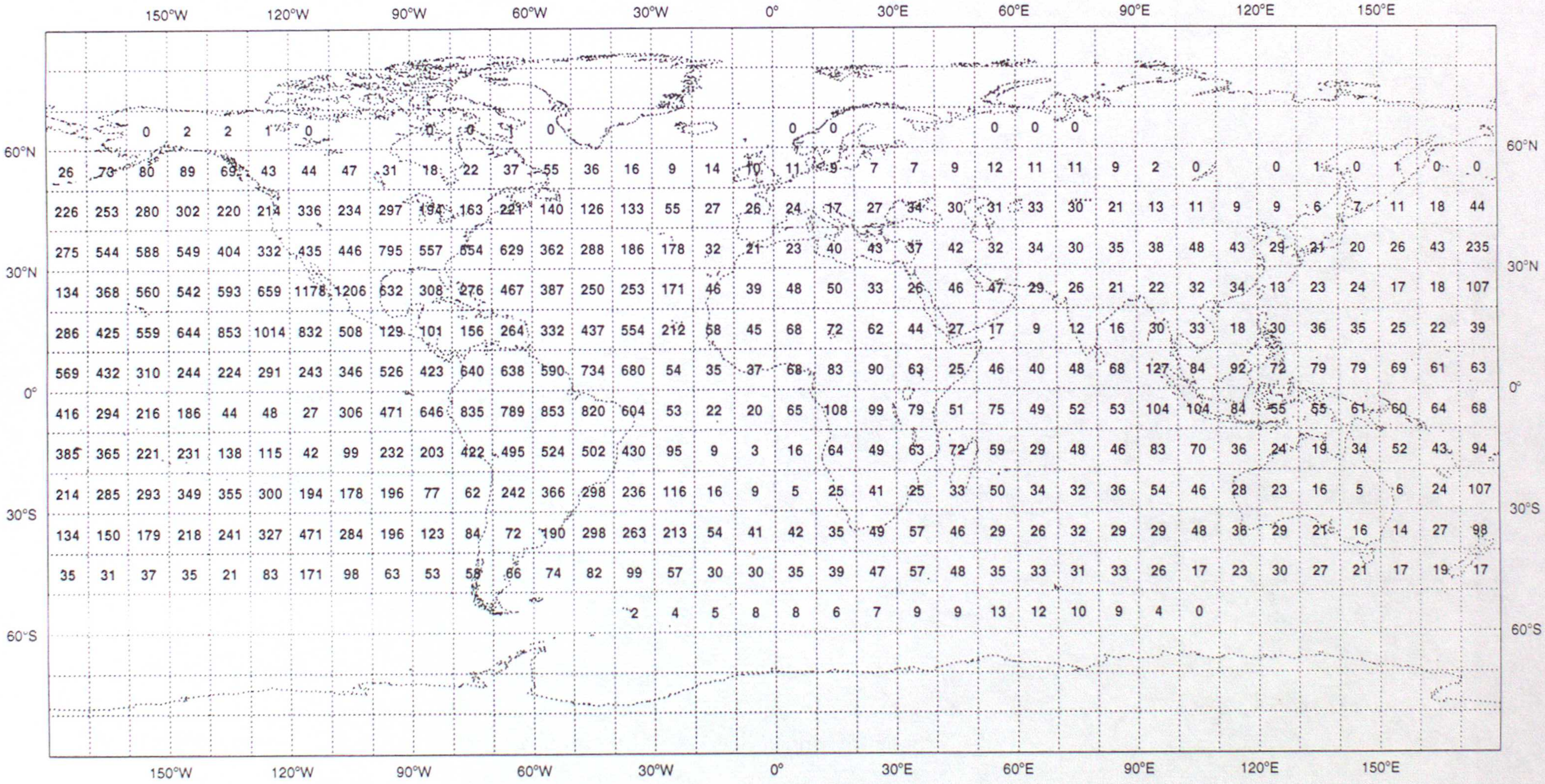

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0 2 2 1 0 0 0 1 0 0 0 0 0 0
26 73 80 89 69 43 44 47 31 18 22 37 55 36 16 9 14 10 11 9 7 7 9 12 11 11 9 2 0 0 1 0 1 0 0
226 253 280 302 220 214 336 234 297 194 163 221 140 126 133 55 27 26 24 17 27 34 30 31 33 30 21 13 11 9 9 6 7 11 18 44
275 544 588 549 404 332 435 446 795 557 654 629 362 288 186 178 32 21 23 40 43 37 42 32 34 30 35 38 48 43 29 21 20 26 43 235
134 368 560 542 593 659 1178 1206 632 308 276 467 387 250 253 171 46 39 48 50 33 26 46 47 29 26 21 22 32 34 13 23 24 17 18 107
286 425 559 644 853 1014 832 508 129 101 156 264 332 437 554 212 58 45 68 72 62 44 27 17 9 12 16 30 33 18 30 36 35 25 22 39
569 432 310 244 224 291 243 346 526 423 640 638 590 734 680 54 35 37 68 83 90 63 25 46 40 48 68 127 84 92 72 79 79 69 61 63
416 294 216 186 44 48 27 306 471 646 835 789 853 820 604 53 22 20 65 108 99 79 51 75 49 52 53 104 104 84 55 55 61 60 64 68
385 365 221 231 138 115 42 99 232 203 422 495 524 502 430 95 9 3 16 64 49 63 72 59 29 48 46 83 70 36 24 19 34 52 43 94
214 285 293 349 355 300 194 178 196 77 62 242 366 298 236 116 16 9 5 25 41 25 33 50 34 32 36 54 46 28 23 16 5 6 24 107
134 150 179 218 241 327 471 284 196 123 84 72 190 298 263 213 54 41 42 35 49 57 46 29 26 32 29 29 48 36 29 21 16 14 27 98
35 31 37 35 21 83 171 98 63 53 58 66 74 82 99 57 30 30 35 39 47 57 48 35 33 31 33 26 17 23 30 27 21 17 19 17
2 4 5 8 8 6 7 9 9 13 12 10 9 4 0

Figure 21. SATOB 101 - 400 hPa vector mean wind. MARCH 2002
All observations
Arrows are plotted where greater than 10 obs are present

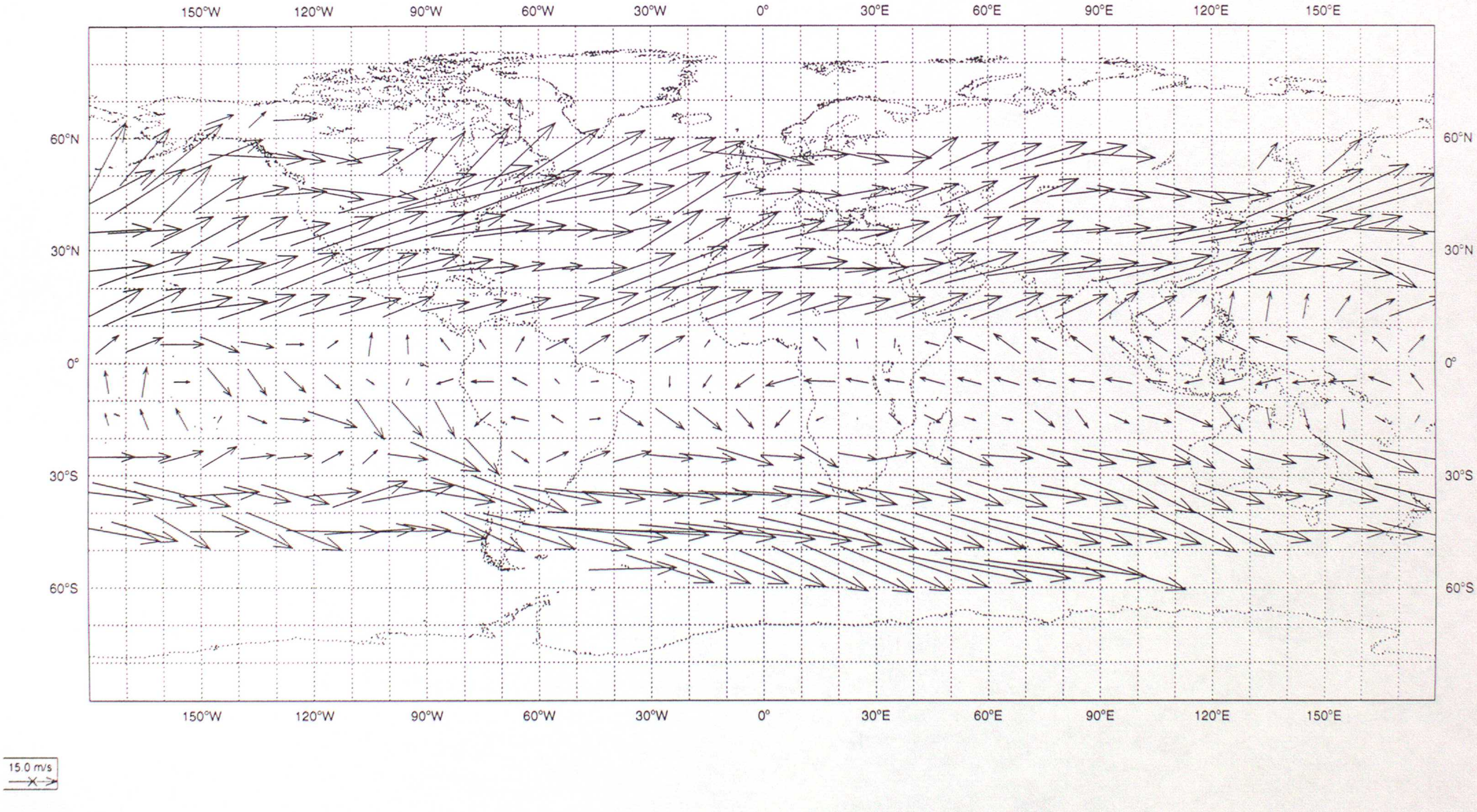

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 22. SATOB 101 - 400 hPa vector wind differences. MARCH 2002
All observations
Arrows are plotted where greater than 10 obs are present

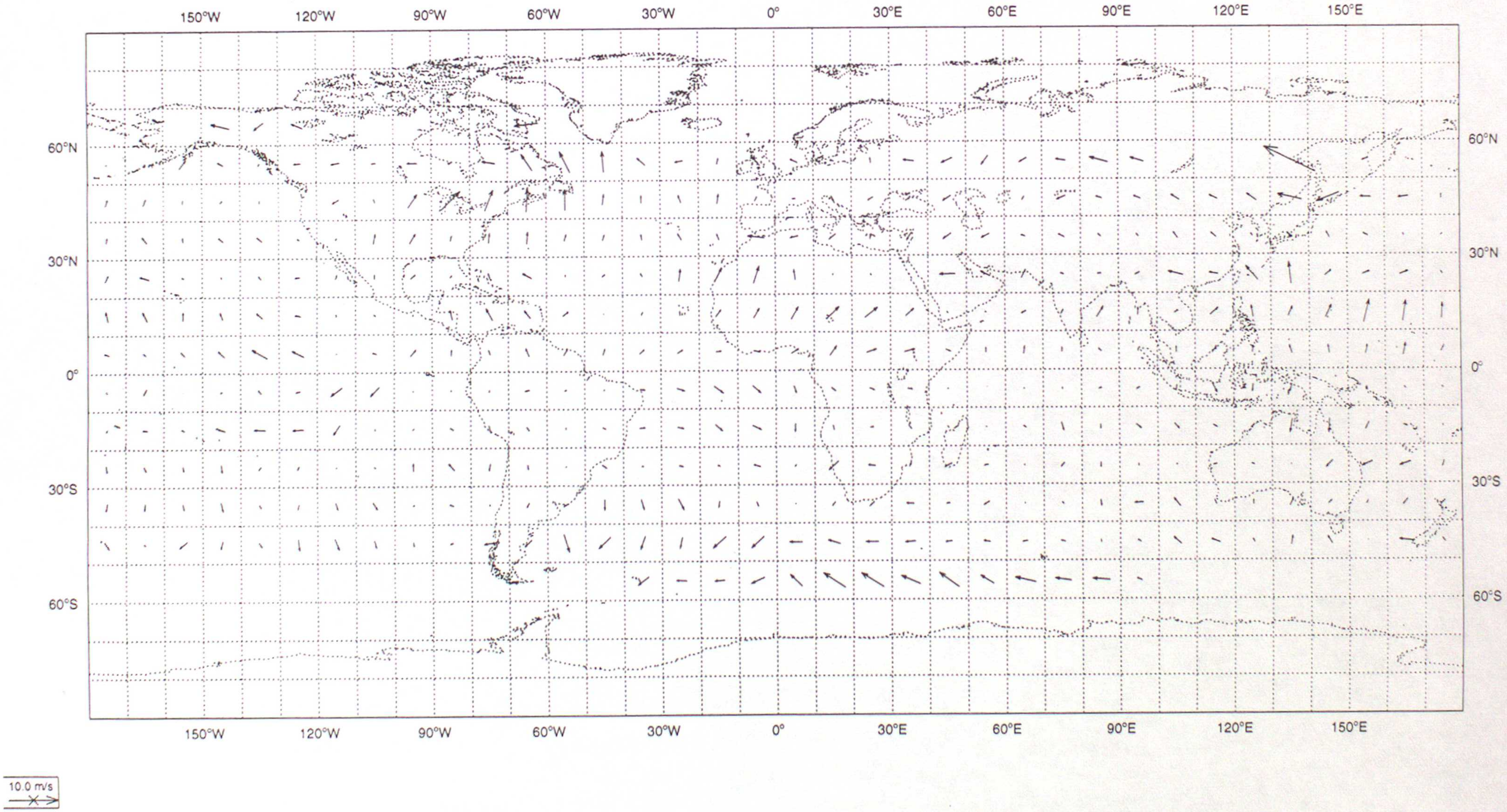

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0 m/s

Figure 23. SATOB 101 - 400 hPa mean O-B speed differences (ms-1). MARCH 2002
All observations
Values are plotted where greater than 10 obs are present

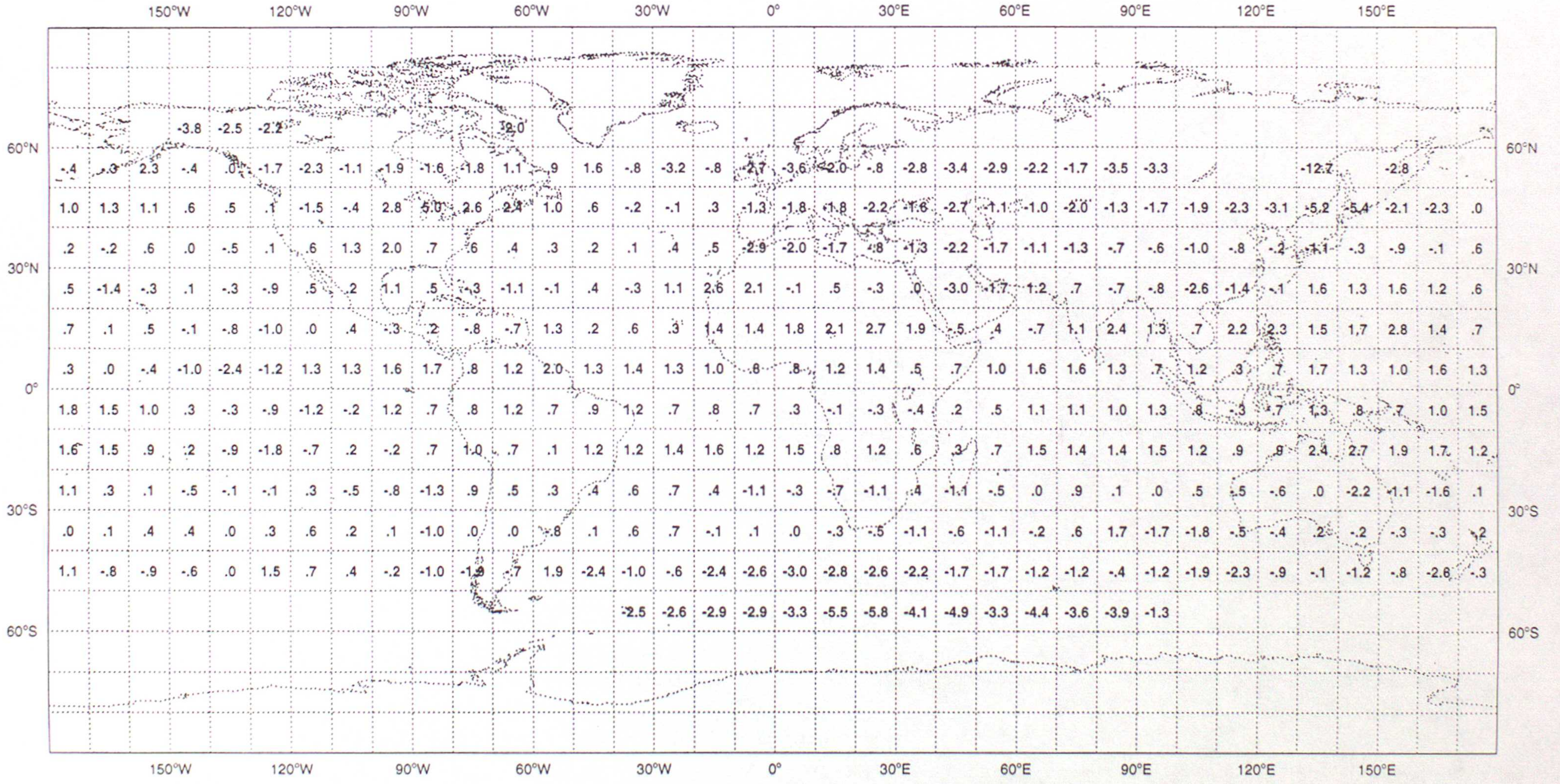
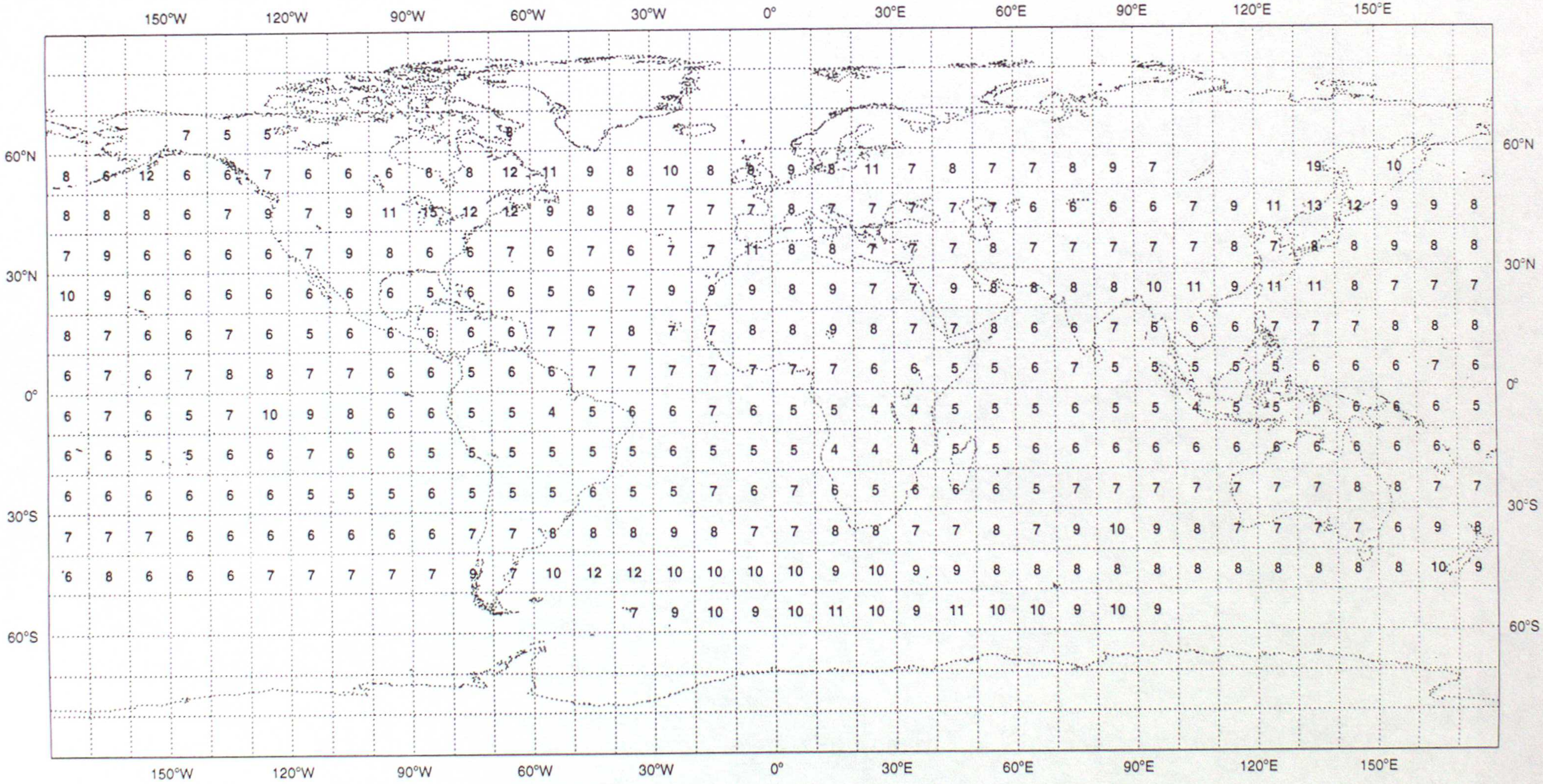

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-3.8 -2.5 -2.2 12.0
-.4 -.3 2.3 -.4 .0 -1.7 -2.3 -1.1 -1.9 -1.6 -1.8 1.1 .9 1.6 -.8 -3.2 -.8 -2.7 -3.6 -2.0 -.8 -2.8 -3.4 -2.9 -2.2 -1.7 -3.5 -3.3 -12.7 -2.8
1.0 1.3 1.1 .6 .5 .1 -1.5 -.4 2.8 5.0 2.6 2.4 1.0 .6 -.2 -.1 .3 -1.3 -1.8 -1.8 -2.2 -1.6 -2.7 -1.1 -1.0 -2.0 -1.3 -1.7 -1.9 -2.3 -3.1 -5.2 -5.4 -2.1 -2.3 .0
.2 -.2 .6 .0 -.5 .1 .6 1.3 2.0 .7 .6 .4 .3 .2 .1 .4 .5 -2.9 -2.0 -1.7 -.8 -1.3 -2.2 -1.7 -1.1 -1.3 -.7 -.6 -1.0 -.8 -.2 -1.1 -.3 -.9 -.1 .6
.5 -1.4 -.3 .1 -.3 -.9 .5 .2 1.1 .5 -.3 -1.1 -.1 .4 -.3 1.1 2.6 2.1 -.1 .5 -.3 .0 -3.0 -1.7 1.2 .7 -.7 -.8 -2.6 -1.4 -.1 1.6 1.3 1.6 1.2 .6
.7 .1 .5 -.1 -.8 -1.0 .0 .4 -.3 .2 -.8 -.7 1.3 .2 .6 .3 1.4 1.4 1.8 2.1 2.7 1.9 -.5 .4 -.7 1.1 2.4 1.3 .7 2.2 2.3 1.5 1.7 2.8 1.4 .7
.3 .0 -.4 -1.0 -2.4 -1.2 1.3 1.3 1.6 1.7 .8 1.2 2.0 1.3 1.4 1.3 1.0 .8 .8 1.2 1.4 .5 .7 1.0 1.6 1.6 1.3 .7 1.2 .3 .7 1.7 1.3 1.0 1.6 1.3
1.8 1.5 1.0 .3 -.3 -.9 -1.2 -.2 1.2 .7 .8 1.2 .7 .9 1.2 .7 .8 .7 .3 -.1 -.3 -.4 .2 .5 1.1 1.1 1.0 1.3 .8 -.3 .7 1.3 .8 .7 1.0 1.5
1.6 1.5 .9 .2 -.9 -1.8 -.7 .2 -.2 .7 1.0 .7 .1 1.2 1.2 1.4 1.6 1.2 1.5 .8 1.2 .6 .3 .7 1.5 1.4 1.4 1.5 1.2 .9 .9 2.4 2.7 1.9 1.7 1.2
1.1 .3 .1 -.5 -.1 -.1 .3 -.5 -.8 -1.3 .9 .5 .3 .4 .6 .7 .4 -1.1 -.3 -.7 -1.1 .4 -1.1 -.5 .0 .9 .1 .0 .5 .5 -.6 .0 -2.2 -1.1 -1.6 .1
.0 .1 .4 .4 .0 .3 .6 .2 .1 -1.0 .0 .0 .8 .1 .6 .7 -.1 .1 .0 -.3 .5 -1.1 -.6 -1.1 -.2 .6 1.7 -1.7 -1.8 -.5 -.4 .2 -.2 -.3 -.3 .2
1.1 -.8 -.9 -.6 .0 1.5 .7 .4 -.2 -1.0 -1.9 .7 1.9 -2.4 -1.0 -.6 -2.4 -2.6 -3.0 -2.8 -2.6 -2.2 -1.7 -1.7 -1.2 -1.2 -.4 -1.2 -1.9 -2.3 -.9 -.1 -1.2 -.8 -2.6 -.3
-2.5 -2.6 -2.9 -2.9 -3.3 -5.5 -5.8 -4.1 -4.9 -3.3 -4.4 -3.6 -3.9 -1.3

Figure 24. SATOB 101 - 400 hPa RMS O-B vector differences (ms-1). MARCH 2002

All observations

Values are plotted where greater than 10 obs are present


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
7 5 5 8
8 6 12 6 6 7 6 6 6 6 8 12 11 9 8 10 8 8 9 8 11 7 8 7 7 8 9 7 19 10
8 8 8 6 7 9 7 9 11 15 12 12 9 8 8 7 7 7 8 7 7 7 7 7 6 6 6 6 7 9 11 13 12 9 9 8
7 9 6 6 6 6 7 9 8 6 6 7 6 7 6 7 7 11 8 8 7 7 7 8 7 7 7 7 7 8 7 8 8 9 8 8
10 9 6 6 6 6 6 6 6 5 6 6 5 6 7 9 9 9 8 9 7 7 9 8 8 8 8 10 11 9 11 11 8 7 7 7
8 7 6 6 7 6 5 6 6 6 6 6 7 7 8 7 7 8 8 9 8 7 7 8 6 6 7 6 6 6 7 7 7 8 8 8
6 7 6 7 8 8 7 7 6 6 5 6 6 7 7 7 7 7 7 7 6 6 5 5 6 7 5 5 5 5 5 6 6 6 7 6
6 7 6 5 7 10 9 8 6 6 5 5 4 5 6 6 7 6 5 5 4 4 5 5 5 6 5 5 4 5 5 6 6 6 6 5
6 6 5 5 6 6 7 6 6 5 5 5 5 5 5 6 5 5 5 4 4 4 5 5 6 6 6 6 6 6 6 6 6 6 6 6
6 6 6 6 6 6 5 5 5 6 5 5 5 6 5 5 7 6 7 6 5 6 6 6 5 7 7 7 7 7 7 7 8 8 7 7
7 7 7 6 6 6 6 6 6 6 7 7 8 8 8 9 8 7 7 8 8 7 7 8 7 9 10 9 8 7 7 7 7 6 9 8
6 8 6 6 6 7 7 7 7 7 9 7 10 12 12 10 10 10 10 9 10 9 9 8 8 8 8 8 8 8 8 8 8 8 10 9
7 9 10 9 10 11 10 9 11 10 10 9 10 9

MONITORING OF SATELLITE TEMPERATURES

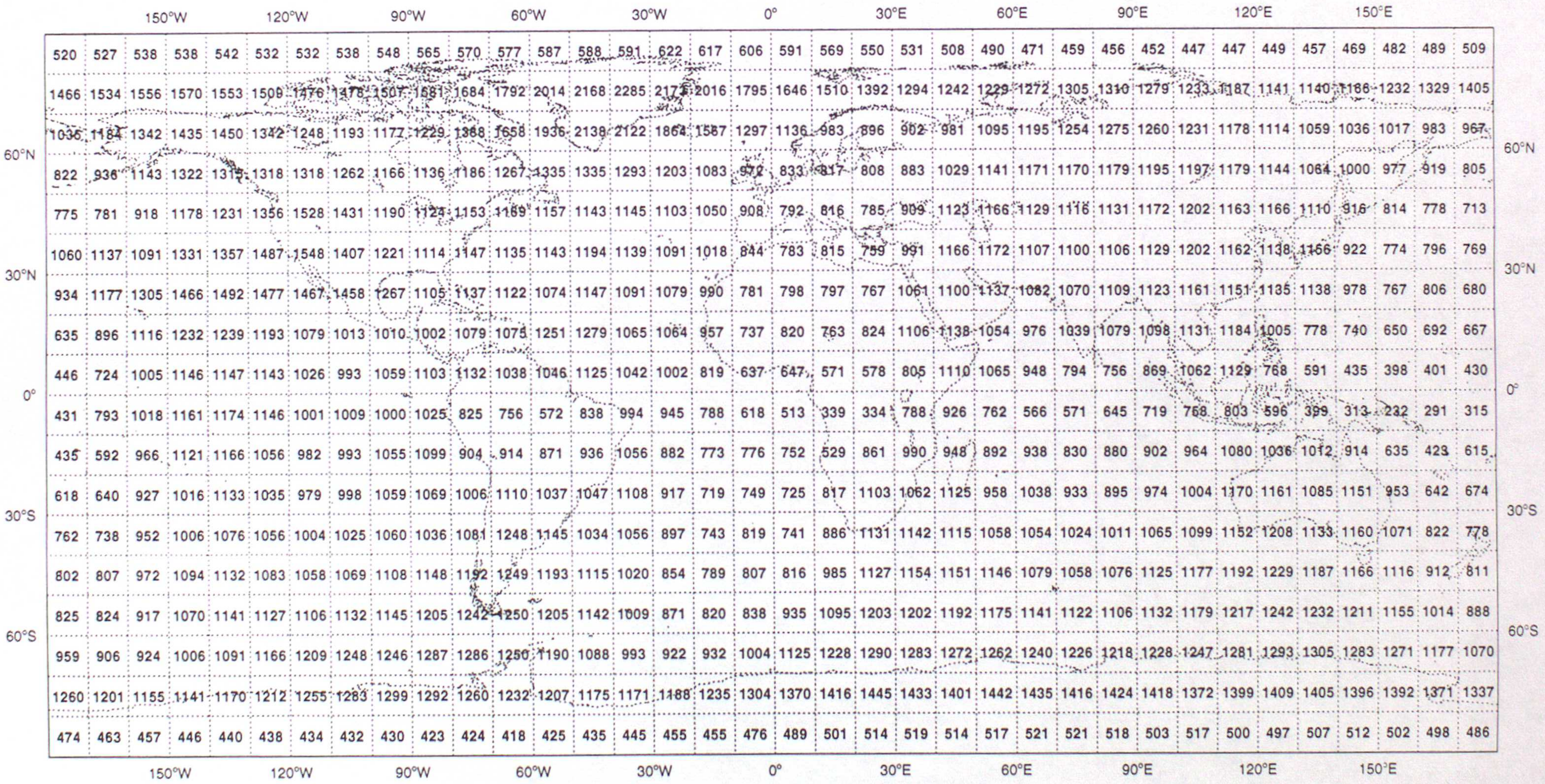
MONITORING CENTRE: BRACKNELL

MONTH: March 2002

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from NOAA-15 and NOAA-16.
Standard of comparison	:Background field from UKMO global model.
Selection Criteria	:All soundings.
Data Extracted	:Sounding channels (and approximate weighting function peaks, hPa) HIRS8 (Surface) HIRS15 (700) HIRS11 (500-700) HIRS4 (400) AMSUA5 (700) AMSUA7 (300) AMSUA9 (100) :Mean and standard deviation observation-minus-background brightness temperature differences

Figure 25. ATOVS mean daily count. MARCH 2002
NOAA15, using all observations
Global average number of observations in 24 hours = 655969

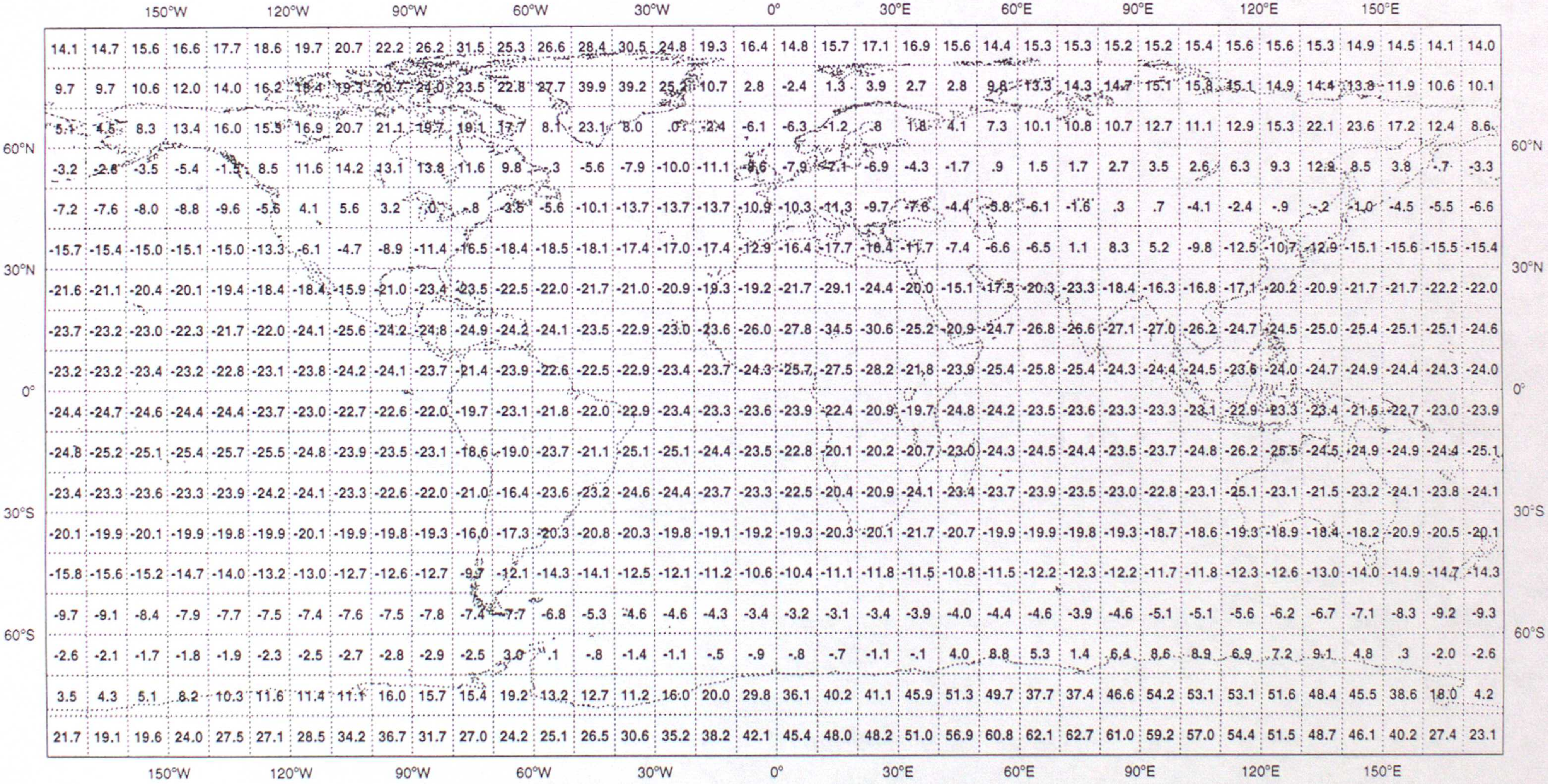


520	527	538	538	542	532	532	538	548	565	570	577	587	588	591	622	617	606	591	569	550	531	508	490	471	459	456	452	447	447	449	457	469	482	489	509
1466	1534	1556	1570	1553	1509	1476	1478	1507	1581	1684	1792	2014	2168	2285	2173	2016	1795	1646	1510	1392	1294	1242	1229	1272	1305	1310	1279	1233	1187	1141	1140	1186	1232	1329	1405
1036	1184	1342	1435	1450	1342	1248	1193	1177	1229	1388	1658	1936	2138	2122	1864	1587	1297	1136	983	896	902	981	1095	1195	1254	1275	1260	1231	1178	1114	1059	1036	1017	983	967
822	936	1143	1322	1315	1318	1318	1262	1166	1136	1186	1267	1335	1335	1293	1203	1083	972	833	817	808	883	1029	1141	1171	1170	1179	1195	1197	1179	1144	1064	1000	977	919	805
775	781	918	1178	1231	1356	1528	1431	1190	1124	1153	1189	1157	1143	1145	1103	1050	908	792	816	785	909	1123	1166	1129	1116	1131	1172	1202	1163	1166	1110	916	814	778	713
1060	1137	1091	1331	1357	1487	1548	1407	1221	1114	1147	1135	1143	1194	1139	1091	1018	844	783	815	759	991	1166	1172	1107	1100	1106	1129	1202	1162	1138	1156	922	774	796	769
934	1177	1305	1466	1492	1477	1467	1458	1267	1105	1137	1122	1074	1147	1091	1079	990	781	798	797	767	1061	1100	1137	1082	1070	1109	1123	1161	1151	1135	1138	978	767	806	680
635	896	1116	1232	1239	1193	1079	1013	1010	1002	1079	1075	1251	1279	1065	1064	957	737	820	763	824	1106	1138	1054	976	1039	1079	1098	1131	1184	1005	778	740	650	692	667
446	724	1005	1146	1147	1143	1026	993	1059	1103	1132	1038	1046	1125	1042	1002	819	637	647	571	578	805	1110	1065	948	794	756	869	1062	1129	768	591	435	398	401	430
431	793	1018	1161	1174	1146	1001	1009	1000	1025	825	756	572	838	994	945	788	618	513	339	334	788	926	762	566	571	645	719	768	803	596	399	313	232	291	315
435	592	966	1121	1166	1056	982	993	1055	1099	904	914	871	936	1056	882	773	776	752	529	861	990	948	892	938	830	880	902	964	1080	1036	1012	914	635	423	615
618	640	927	1016	1133	1035	979	998	1059	1069	1006	1110	1037	1047	1108	917	719	749	725	817	1103	1062	1125	958	1038	933	895	974	1004	1170	1161	1085	1151	953	642	674
762	738	952	1006	1076	1056	1004	1025	1060	1036	1081	1248	1145	1034	1056	897	743	819	741	886	1131	1142	1115	1058	1054	1024	1011	1065	1099	1152	1208	1133	1160	1071	822	778
802	807	972	1094	1132	1083	1058	1069	1108	1148	1192	1249	1193	1115	1020	854	789	807	816	985	1127	1154	1151	1146	1079	1058	1076	1125	1177	1192	1229	1187	1166	1116	912	811
825	824	917	1070	1141	1127	1106	1132	1145	1205	1242	1250	1205	1142	1009	871	820	838	935	1095	1203	1202	1192	1175	1141	1122	1106	1132	1179	1217	1242	1232	1211	1155	1014	888
959	906	924	1006	1091	1166	1209	1248	1246	1287	1286	1250	1190	1088	993	922	932	1004	1125	1228	1290	1283	1272	1262	1240	1226	1218	1228	1247	1281	1293	1305	1283	1271	1177	1070
1260	1201	1155	1141	1170	1212	1255	1283	1299	1292	1260	1232	1207	1175	1171	1188	1235	1304	1370	1416	1445	1433	1401	1442	1435	1416	1424	1418	1372	1399	1409	1405	1396	1392	1371	1337
474	463	457	446	440	438	434	432	430	423	424	418	425	435	445	455	455	476	489	501	514	519	514	517	521	521	518	503	517	500	497	507	512	502	498	486

Figure 26. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2002

Channel: HIRS8 (Surface)

NOAA15, using all observations



14.1	14.7	15.6	16.6	17.7	18.6	19.7	20.7	22.2	26.2	31.5	25.3	26.6	28.4	30.5	24.8	19.3	16.4	14.8	15.7	17.1	16.9	15.6	14.4	15.3	15.3	15.2	15.2	15.4	15.6	15.6	15.3	14.9	14.5	14.1	14.0
9.7	9.7	10.6	12.0	14.0	16.2	18.4	19.3	20.7	24.0	23.5	22.8	27.7	39.9	39.2	25.2	10.7	2.8	-2.4	1.3	3.9	2.7	2.8	9.8	13.3	14.3	14.7	15.1	15.8	15.1	14.9	14.4	13.8	11.9	10.6	10.1
5.1	4.5	8.3	13.4	16.0	15.5	16.9	20.7	21.1	19.7	19.1	17.7	8.1	23.1	8.0	.0	-2.4	-6.1	-6.3	-1.2	.8	1.8	4.1	7.3	10.1	10.8	10.7	12.7	11.1	12.9	15.3	22.1	23.6	17.2	12.4	8.6
-3.2	-2.8	-3.5	-5.4	-1.5	8.5	11.6	14.2	13.1	13.8	11.6	9.8	-.3	-5.6	-7.9	-10.0	-11.1	-8.6	-7.9	-7.1	-6.9	-4.3	-1.7	.9	1.5	1.7	2.7	3.5	2.6	6.3	9.3	12.9	8.5	3.8	-.7	-3.3
-7.2	-7.6	-8.0	-8.8	-9.6	-5.6	4.1	5.6	3.2	.0	-.8	-3.5	-5.6	-10.1	-13.7	-13.7	-13.7	-10.9	-10.3	-11.3	-9.7	-7.6	-4.4	-5.8	-6.1	-1.6	.3	.7	-4.1	-2.4	-.9	-.2	-1.0	-4.5	-5.5	-6.6
-15.7	-15.4	-15.0	-15.1	-15.0	-13.3	-6.1	-4.7	-8.9	-11.4	-16.5	-18.4	-18.5	-18.1	-17.4	-17.0	-17.4	-12.9	-16.4	-17.7	-16.4	-11.7	-7.4	-6.6	-6.5	1.1	8.3	5.2	-9.8	-12.5	-10.7	-12.9	-15.1	-15.6	-15.5	-15.4
-21.6	-21.1	-20.4	-20.1	-19.4	-18.4	-18.4	-15.9	-21.0	-23.4	-23.5	-22.5	-22.0	-21.7	-21.0	-20.9	-19.3	-19.2	-21.7	-29.1	-24.4	-20.0	-15.1	-17.5	-20.3	-23.3	-18.4	-16.3	-16.8	-17.1	-20.2	-20.9	-21.7	-21.7	-22.2	-22.0
-23.7	-23.2	-23.0	-22.3	-21.7	-22.0	-24.1	-25.6	-24.2	-24.8	-24.9	-24.2	-24.1	-23.5	-22.9	-23.0	-23.6	-26.0	-27.8	-34.5	-30.6	-25.2	-20.9	-24.7	-26.8	-26.6	-27.1	-27.0	-26.2	-24.7	-24.5	-25.0	-25.4	-25.1	-25.1	-24.6
-23.2	-23.2	-23.4	-23.2	-22.8	-23.1	-23.8	-24.2	-24.1	-23.7	-21.4	-23.9	-22.6	-22.5	-22.9	-23.4	-23.7	-24.3	-25.7	-27.5	-28.2	-21.8	-23.9	-25.4	-25.8	-25.4	-24.3	-24.4	-24.5	-23.6	-24.0	-24.7	-24.9	-24.4	-24.3	-24.0
-24.4	-24.7	-24.6	-24.4	-24.4	-23.7	-23.0	-22.7	-22.6	-22.0	-19.7	-23.1	-21.8	-22.0	-22.9	-23.4	-23.3	-23.6	-23.9	-22.4	-20.9	-19.7	-24.8	-24.2	-23.5	-23.6	-23.3	-23.3	-23.1	-22.9	-23.3	-23.4	-21.5	-22.7	-23.0	-23.9
-24.8	-25.2	-25.1	-25.4	-25.7	-25.5	-24.8	-23.9	-23.5	-23.1	-18.6	-19.0	-23.7	-21.1	-25.1	-25.1	-24.4	-23.5	-22.8	-20.1	-20.2	-20.7	-23.0	-24.3	-24.5	-24.4	-23.5	-23.7	-24.8	-26.2	-25.5	-24.5	-24.9	-24.9	-24.4	-25.1
-23.4	-23.3	-23.6	-23.3	-23.9	-24.2	-24.1	-23.3	-22.6	-22.0	-21.0	-16.4	-23.6	-23.2	-24.6	-24.4	-23.7	-23.3	-22.5	-20.4	-20.9	-24.1	-23.4	-23.7	-23.9	-23.5	-23.0	-22.8	-23.1	-25.1	-23.1	-21.5	-23.2	-24.1	-23.8	-24.1
-20.1	-19.9	-20.1	-19.9	-19.8	-19.9	-20.1	-19.9	-19.8	-19.3	-16.0	-17.3	-20.3	-20.8	-20.3	-19.8	-19.1	-19.2	-19.3	-20.3	-20.1	-21.7	-20.7	-19.9	-19.9	-19.8	-19.3	-18.7	-18.6	-19.3	-18.9	-18.4	-18.2	-20.9	-20.5	-20.1
-15.8	-15.6	-15.2	-14.7	-14.0	-13.2	-13.0	-12.7	-12.6	-12.7	-9.7	-12.1	-14.3	-14.1	-12.5	-12.1	-11.2	-10.6	-10.4	-11.1	-11.8	-11.5	-10.8	-11.5	-12.2	-12.3	-12.2	-11.7	-11.8	-12.3	-12.6	-13.0	-14.0	-14.9	-14.7	-14.3
-9.7	-9.1	-8.4	-7.9	-7.7	-7.5	-7.4	-7.6	-7.5	-7.8	-7.4	-7.7	-6.8	-5.3	-4.6	-4.6	-4.3	-3.4	-3.2	-3.1	-3.4	-3.9	-4.0	-4.4	-4.6	-3.9	-4.6	-5.1	-5.1	-5.6	-6.2	-6.7	-7.1	-8.3	-9.2	-9.3
-2.6	-2.1	-1.7	-1.8	-1.9	-2.3	-2.5	-2.7	-2.8	-2.9	-2.5	3.0	.1	-.8	-1.4	-1.1	-.5	-.9	-.8	-.7	-1.1	-.1	4.0	8.8	5.3	1.4	6.4	8.6	8.9	6.9	7.2	9.1	4.8	.3	-2.0	-2.6
3.5	4.3	5.1	8.2	10.3	11.6	11.4	11.1	16.0	15.7	15.4	19.2	13.2	12.7	11.2	16.0	20.0	29.8	36.1	40.2	41.1	45.9	51.3	49.7	37.7	37.4	46.6	54.2	53.1	53.1	51.6	48.4	45.5	38.6	18.0	4.2
21.7	19.1	19.6	24.0	27.5	27.1	28.5	34.2	36.7	31.7	27.0	24.2	25.1	26.5	30.6	35.2	38.2	42.1	45.4	48.0	48.2	51.0	56.9	60.8	62.1	62.7	61.0	59.2	57.0	54.4	51.5	48.7	46.1	40.2	27.4	23.1

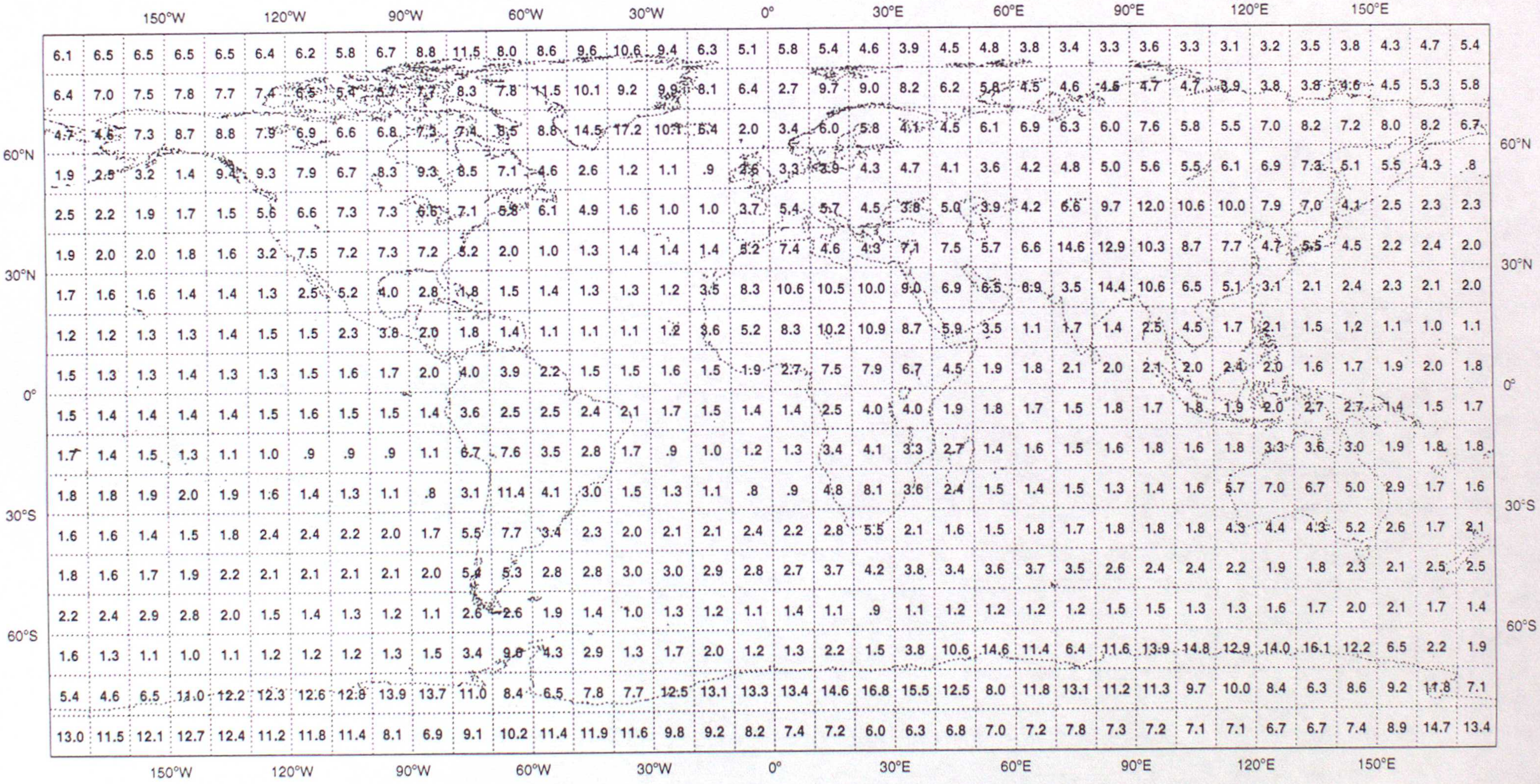
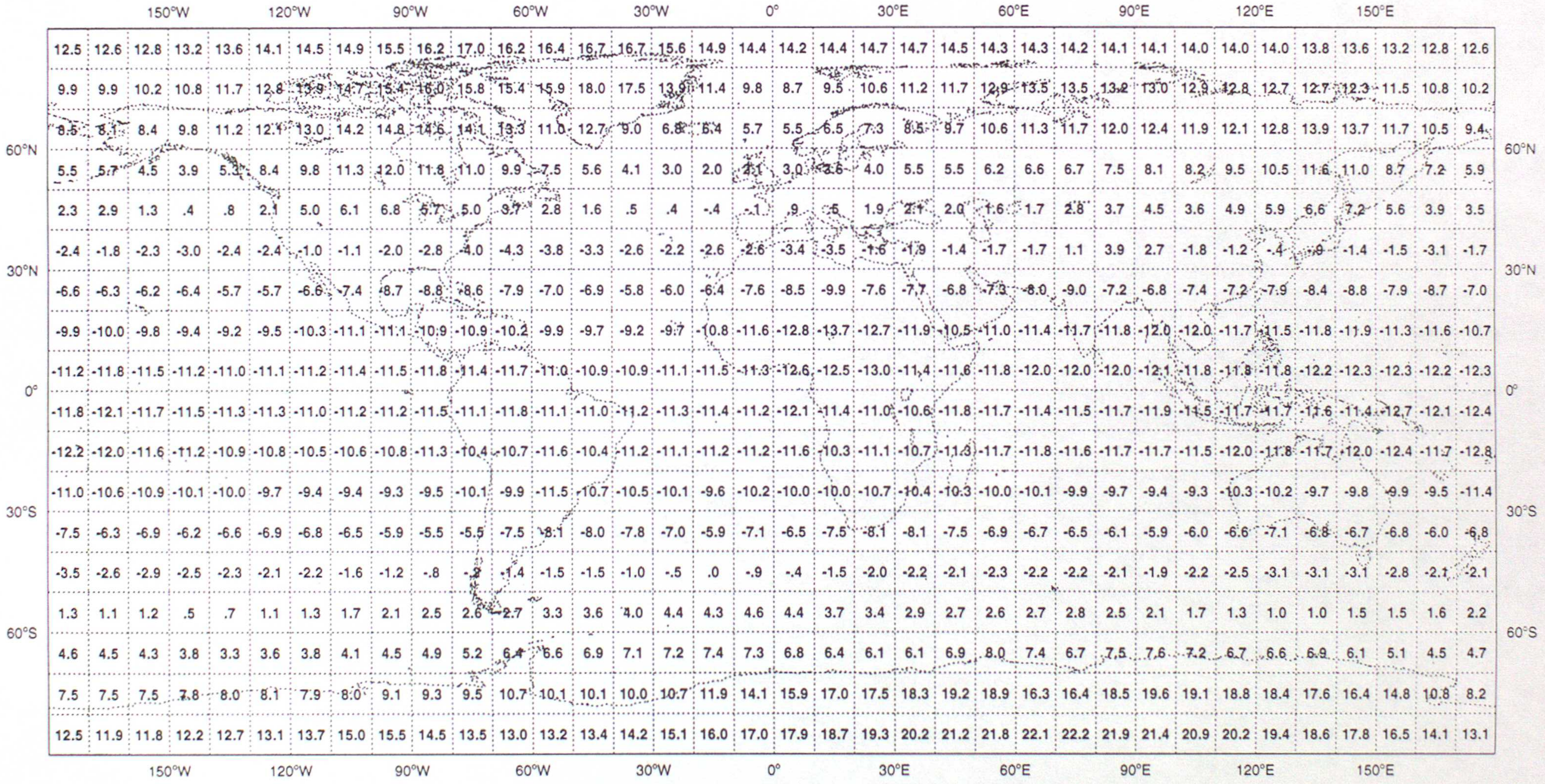


Figure 27. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2002
Channel: HIRS8 (Surface)
NOAA15, using all observations

6.1	6.5	6.5	6.5	6.5	6.4	6.2	5.8	6.7	8.8	11.5	8.0	8.6	9.6	10.6	9.4	6.3	5.1	5.8	5.4	4.6	3.9	4.5	4.8	3.8	3.4	3.3	3.6	3.3	3.1	3.2	3.5	3.8	4.3	4.7	5.4
6.4	7.0	7.5	7.8	7.7	7.4	6.5	5.4	5.7	7.7	8.3	7.8	11.5	10.1	9.2	9.9	8.1	6.4	2.7	9.7	9.0	8.2	6.2	5.8	4.5	4.6	4.6	4.7	4.7	3.9	3.8	3.8	4.6	4.5	5.3	5.8
4.7	4.6	7.3	8.7	8.8	7.9	6.9	6.6	6.8	7.3	7.4	8.5	8.8	14.5	17.2	10.1	5.4	2.0	3.4	6.0	5.8	4.1	4.5	6.1	6.9	6.3	6.0	7.6	5.8	5.5	7.0	8.2	7.2	8.0	8.2	6.7
1.9	2.5	3.2	1.4	9.4	9.3	7.9	6.7	8.3	9.3	8.5	7.1	4.6	2.6	1.2	1.1	.9	2.6	3.3	3.9	4.3	4.7	4.1	3.6	4.2	4.8	5.0	5.6	5.5	6.1	6.9	7.3	5.1	5.5	4.3	.8
2.5	2.2	1.9	1.7	1.5	5.6	6.6	7.3	7.3	6.6	7.1	5.8	6.1	4.9	1.6	1.0	1.0	3.7	5.4	5.7	4.5	3.8	5.0	3.9	4.2	6.6	9.7	12.0	10.6	10.0	7.9	7.0	4.1	2.5	2.3	2.3
1.9	2.0	2.0	1.8	1.6	3.2	7.5	7.2	7.3	7.2	5.2	2.0	1.0	1.3	1.4	1.4	1.4	5.2	7.4	4.6	4.3	7.1	7.5	5.7	6.6	14.6	12.9	10.3	8.7	7.7	4.7	5.5	4.5	2.2	2.4	2.0
1.7	1.6	1.6	1.4	1.4	1.3	2.5	5.2	4.0	2.8	1.8	1.5	1.4	1.3	1.3	1.2	3.5	8.3	10.6	10.5	10.0	9.0	6.9	6.5	6.9	3.5	14.4	10.6	6.5	5.1	3.1	2.1	2.4	2.3	2.1	2.0
1.2	1.2	1.3	1.3	1.4	1.5	1.5	2.3	3.8	2.0	1.8	1.4	1.1	1.1	1.1	1.2	3.6	5.2	8.3	10.2	10.9	8.7	5.9	3.5	1.1	1.7	1.4	2.5	4.5	1.7	2.1	1.5	1.2	1.1	1.0	1.1
1.5	1.3	1.3	1.4	1.3	1.3	1.5	1.6	1.7	2.0	4.0	3.9	2.2	1.5	1.5	1.6	1.5	1.9	2.7	7.5	7.9	6.7	4.5	1.9	1.8	2.1	2.0	2.1	2.0	2.4	2.0	1.6	1.7	1.9	2.0	1.8
1.5	1.4	1.4	1.4	1.4	1.5	1.6	1.5	1.5	1.4	3.6	2.5	2.5	2.4	2.1	1.7	1.5	1.4	1.4	2.5	4.0	4.0	1.9	1.8	1.7	1.5	1.8	1.7	1.8	1.9	2.0	2.7	2.7	1.4	1.5	1.7
1.7	1.4	1.5	1.3	1.1	1.0	.9	.9	.9	1.1	6.7	7.6	3.5	2.8	1.7	.9	1.0	1.2	1.3	3.4	4.1	3.3	2.7	1.4	1.6	1.5	1.6	1.8	1.6	1.8	3.3	3.6	3.0	1.9	1.8	1.8
1.8	1.8	1.9	2.0	1.9	1.6	1.4	1.3	1.1	.8	3.1	11.4	4.1	3.0	1.5	1.3	1.1	.8	.9	4.8	8.1	3.6	2.4	1.5	1.4	1.5	1.3	1.4	1.6	5.7	7.0	6.7	5.0	2.9	1.7	1.6
1.6	1.6	1.4	1.5	1.8	2.4	2.4	2.2	2.0	1.7	5.5	7.7	3.4	2.3	2.0	2.1	2.1	2.4	2.2	2.8	5.5	2.1	1.6	1.5	1.8	1.7	1.8	1.8	1.8	4.3	4.4	4.3	5.2	2.6	1.7	2.1
1.8	1.6	1.7	1.9	2.2	2.1	2.1	2.1	2.1	2.0	5.4	5.3	2.8	2.8	3.0	3.0	2.9	2.8	2.7	3.7	4.2	3.8	3.4	3.6	3.7	3.5	2.6	2.4	2.4	2.2	1.9	1.8	2.3	2.1	2.5	2.5
2.2	2.4	2.9	2.8	2.0	1.5	1.4	1.3	1.2	1.1	2.6	2.6	1.9	1.4	1.0	1.3	1.2	1.1	1.4	1.1	.9	1.1	1.2	1.2	1.2	1.2	1.5	1.5	1.3	1.3	1.6	1.7	2.0	2.1	1.7	1.4
1.6	1.3	1.1	1.0	1.1	1.2	1.2	1.2	1.3	1.5	3.4	9.8	4.3	2.9	1.3	1.7	2.0	1.2	1.3	2.2	1.5	3.8	10.6	14.6	11.4	6.4	11.6	13.9	14.8	12.9	14.0	16.1	12.2	6.5	2.2	1.9
5.4	4.6	6.5	11.0	12.2	12.3	12.6	12.8	13.9	13.7	11.0	8.4	6.5	7.8	7.7	12.5	13.1	13.3	13.4	14.6	16.8	15.5	12.5	8.0	11.8	13.1	11.2	11.3	9.7	10.0	8.4	6.3	8.6	9.2	11.8	7.1
13.0	11.5	12.1	12.7	12.4	11.2	11.8	11.4	8.1	6.9	9.1	10.2	11.4	11.9	11.6	9.8	9.2	8.2	7.4	7.2	6.0	6.3	6.8	7.0	7.2	7.8	7.3	7.2	7.1	7.1	6.7	6.7	7.4	8.9	14.7	13.4

Figure 28. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2002
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



12.5	12.6	12.8	13.2	13.6	14.1	14.5	14.9	15.5	16.2	17.0	16.2	16.4	16.7	16.7	15.6	14.9	14.4	14.2	14.4	14.7	14.7	14.5	14.3	14.3	14.2	14.1	14.1	14.0	14.0	14.0	13.8	13.6	13.2	12.8	12.6
9.9	9.9	10.2	10.8	11.7	12.8	13.9	14.7	15.4	16.0	15.8	15.4	15.9	18.0	17.5	13.9	11.4	9.8	8.7	9.5	10.6	11.2	11.7	12.9	13.5	13.5	13.2	13.0	12.9	12.8	12.7	12.7	12.3	11.5	10.8	10.2
8.5	8.1	8.4	9.8	11.2	12.1	13.0	14.2	14.8	14.6	14.1	13.3	11.0	12.7	9.0	6.8	6.4	5.7	5.5	6.5	7.3	8.5	9.7	10.6	11.3	11.7	12.0	12.4	11.9	12.1	12.8	13.9	13.7	11.7	10.5	9.4
5.5	5.7	4.5	3.9	5.3	8.4	9.8	11.3	12.0	11.8	11.0	9.9	7.5	5.6	4.1	3.0	2.0	2.1	3.0	3.6	4.0	5.5	5.5	6.2	6.6	6.7	7.5	8.1	8.2	9.5	10.5	11.6	11.0	8.7	7.2	5.9
2.3	2.9	1.3	.4	.8	2.1	5.0	6.1	6.8	5.7	5.0	3.7	2.8	1.6	.5	.4	-.4	-.1	.9	.5	1.9	2.1	2.0	1.6	1.7	2.8	3.7	4.5	3.6	4.9	5.9	6.6	7.2	5.6	3.9	3.5
-2.4	-1.8	-2.3	-3.0	-2.4	-2.4	-1.0	-1.1	-2.0	-2.8	-4.0	-4.3	-3.8	-3.3	-2.6	-2.2	-2.6	-2.6	-3.4	-3.5	-1.6	-1.9	-1.4	-1.7	-1.7	1.1	3.9	2.7	-1.8	-1.2	-.4	-.9	-1.4	-1.5	-3.1	-1.7
-6.6	-6.3	-6.2	-6.4	-5.7	-5.7	-6.6	-7.4	-8.7	-8.8	-8.6	-7.9	-7.0	-6.9	-5.8	-6.0	-6.4	-7.6	-8.5	-9.9	-7.6	-7.7	-6.8	-7.3	-8.0	-9.0	-7.2	-6.8	-7.4	-7.2	-7.9	-8.4	-8.8	-7.9	-8.7	-7.0
-9.9	-10.0	-9.8	-9.4	-9.2	-9.5	-10.3	-11.1	-11.1	-10.9	-10.9	-10.2	-9.9	-9.7	-9.2	-9.7	-10.8	-11.6	-12.8	-13.7	-12.7	-11.9	-10.5	-11.0	-11.4	-11.7	-11.8	-12.0	-12.0	-11.7	-11.5	-11.8	-11.9	-11.3	-11.6	-10.7
-11.2	-11.8	-11.5	-11.2	-11.0	-11.1	-11.2	-11.4	-11.5	-11.8	-11.4	-11.7	-11.0	-10.9	-10.9	-11.1	-11.5	-11.3	-12.6	-12.5	-13.0	-11.4	-11.6	-11.8	-12.0	-12.0	-12.0	-12.1	-11.8	-11.8	-11.8	-12.2	-12.3	-12.3	-12.2	-12.3
-11.8	-12.1	-11.7	-11.5	-11.3	-11.3	-11.0	-11.2	-11.2	-11.5	-11.1	-11.8	-11.1	-11.0	-11.2	-11.3	-11.4	-11.2	-12.1	-11.4	-11.0	-10.6	-11.8	-11.7	-11.4	-11.5	-11.7	-11.9	-11.5	-11.7	-11.7	-11.6	-11.4	-12.7	-12.1	-12.4
-12.2	-12.0	-11.6	-11.2	-10.9	-10.8	-10.5	-10.6	-10.8	-11.3	-10.4	-10.7	-11.6	-10.4	-11.2	-11.1	-11.2	-11.2	-11.6	-10.3	-11.1	-10.7	-11.3	-11.7	-11.8	-11.6	-11.7	-11.7	-11.5	-12.0	-11.8	-11.7	-12.0	-12.4	-11.7	-12.8
-11.0	-10.6	-10.9	-10.1	-10.0	-9.7	-9.4	-9.4	-9.3	-9.5	-10.1	-9.9	-11.5	-10.7	-10.5	-10.1	-9.6	-10.2	-10.0	-10.0	-10.7	-10.4	-10.3	-10.0	-10.1	-9.9	-9.7	-9.4	-9.3	-10.3	-10.2	-9.7	-9.8	-9.9	-9.5	-11.4
-7.5	-6.3	-6.9	-6.2	-6.6	-6.9	-6.8	-6.5	-5.9	-5.5	-5.5	-7.5	-8.1	-8.0	-7.8	-7.0	-5.9	-7.1	-6.5	-7.5	-8.1	-8.1	-7.5	-6.9	-6.7	-6.5	-6.1	-5.9	-6.0	-6.6	-7.1	-6.8	-6.7	-6.8	-6.0	-6.8
-3.5	-2.6	-2.9	-2.5	-2.3	-2.1	-2.2	-1.6	-1.2	-.8	-.2	-1.4	-1.5	-1.5	-1.0	-.5	.0	-.9	-.4	-1.5	-2.0	-2.2	-2.1	-2.3	-2.2	-2.2	-2.1	-1.9	-2.2	-2.5	-3.1	-3.1	-3.1	-2.8	-2.1	-2.1
1.3	1.1	1.2	.5	.7	1.1	1.3	1.7	2.1	2.5	2.6	2.7	3.3	3.6	4.0	4.4	4.3	4.6	4.4	3.7	3.4	2.9	2.7	2.6	2.7	2.8	2.5	2.1	1.7	1.3	1.0	1.0	1.5	1.5	1.6	2.2
4.6	4.5	4.3	3.8	3.3	3.6	3.8	4.1	4.5	4.9	5.2	6.4	6.6	6.9	7.1	7.2	7.4	7.3	6.8	6.4	6.1	6.1	6.9	8.0	7.4	6.7	7.5	7.6	7.2	6.7	6.6	6.9	6.1	5.1	4.5	4.7
7.5	7.5	7.5	7.8	8.0	8.1	7.9	8.0	9.1	9.3	9.5	10.7	10.1	10.1	10.0	10.7	11.9	14.1	15.9	17.0	17.5	18.3	19.2	18.9	16.3	16.4	18.5	19.6	19.1	18.8	18.4	17.6	16.4	14.8	10.8	8.2
12.5	11.9	11.8	12.2	12.7	13.1	13.7	15.0	15.5	14.5	13.5	13.0	13.2	13.4	14.2	15.1	16.0	17.0	17.9	18.7	19.3	20.2	21.2	21.8	22.1	22.2	21.9	21.4	20.9	20.2	19.4	18.6	17.8	16.5	14.1	13.1

Figure 29. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2002

Channel: HIRS15 (700 hPa)

NOAA15, using all observations

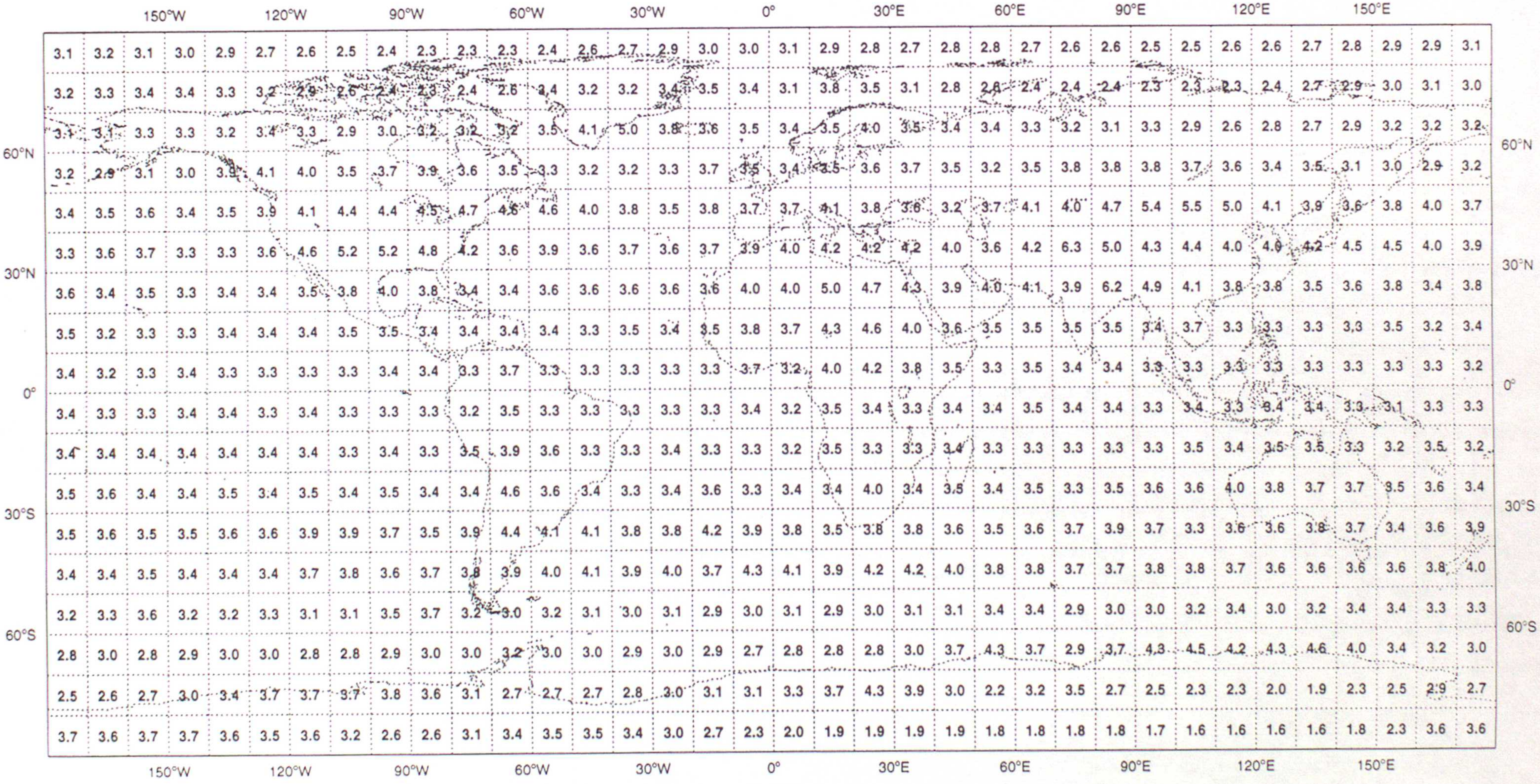
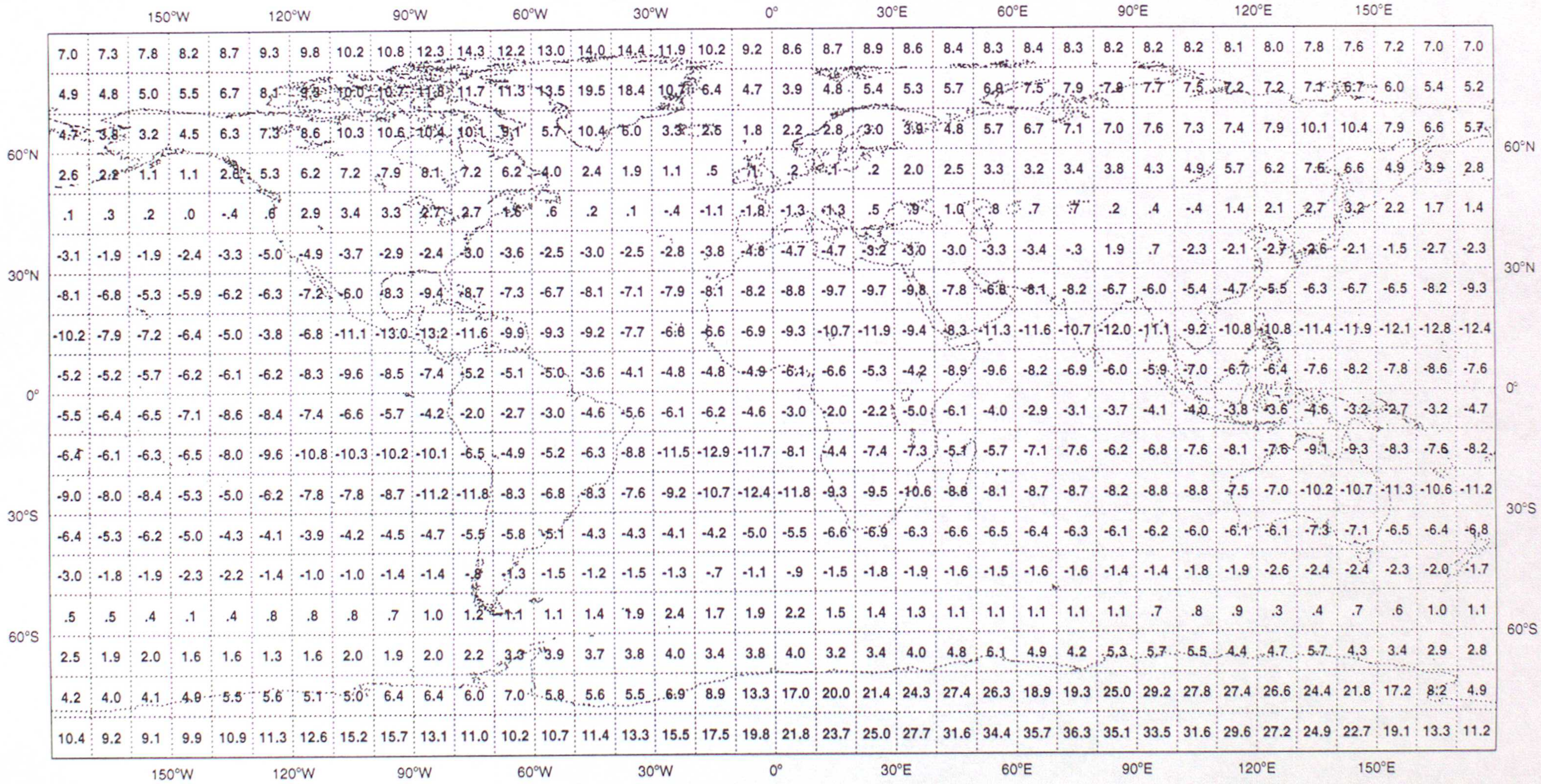
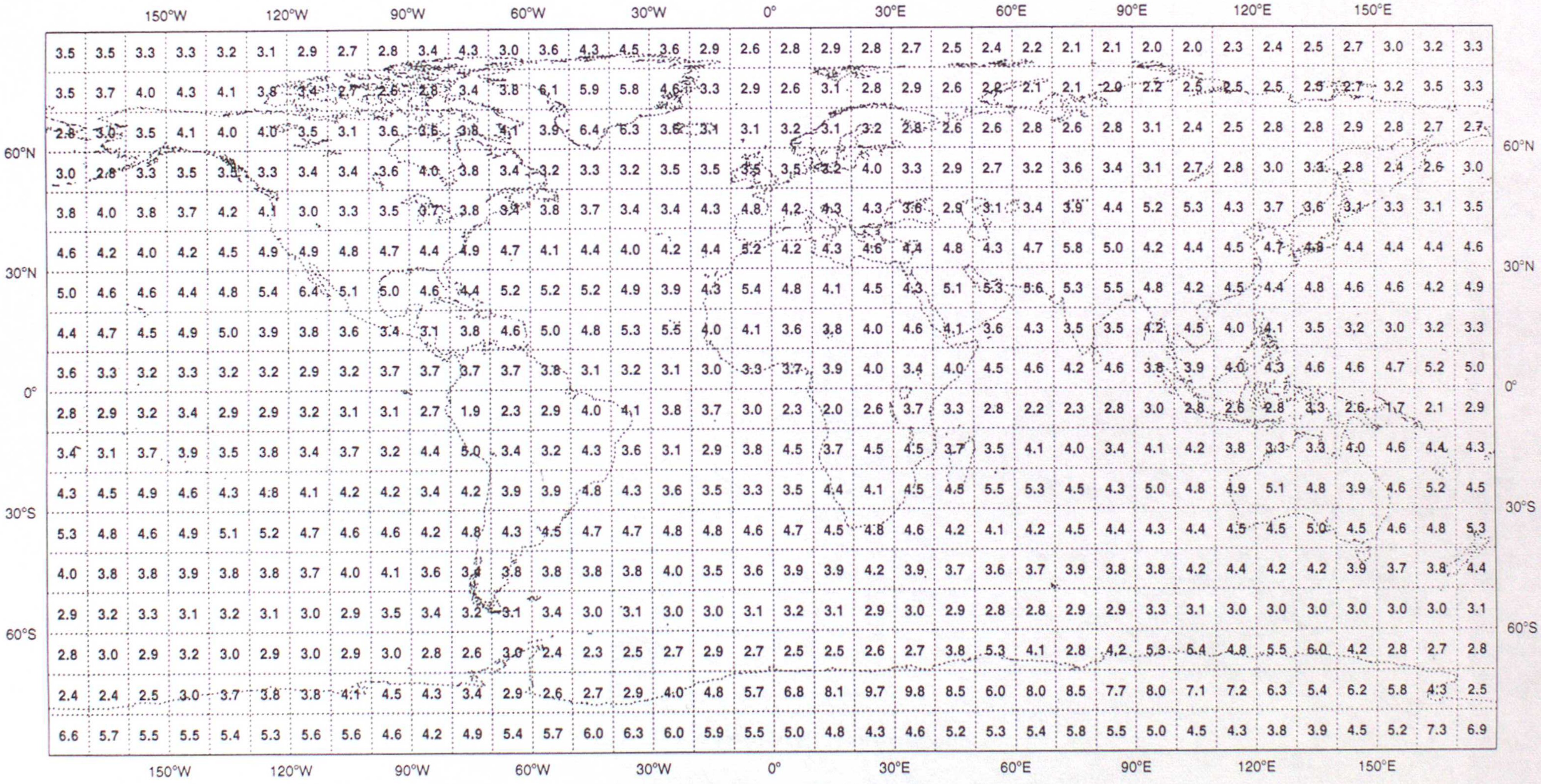

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
3.1 3.2 3.1 3.0 2.9 2.7 2.6 2.5 2.4 2.3 2.3 2.3 2.4 2.6 2.7 2.9 3.0 3.0 3.1 2.9 2.8 2.7 2.8 2.8 2.7 2.6 2.6 2.5 2.5 2.6 2.6 2.7 2.8 2.9 2.9 3.1
3.2 3.3 3.4 3.4 3.3 3.2 2.9 2.6 2.4 2.3 2.4 2.6 3.4 3.2 3.2 3.4 3.5 3.4 3.1 3.8 3.5 3.1 2.8 2.8 2.4 2.4 2.4 2.3 2.3 2.3 2.4 2.7 2.9 3.0 3.1 3.0
3.1 3.1 3.3 3.3 3.2 3.4 3.3 2.9 3.0 3.2 3.2 3.2 3.5 4.1 5.0 3.8 3.6 3.5 3.4 3.5 4.0 3.5 3.4 3.4 3.3 3.2 3.1 3.3 2.9 2.6 2.8 2.7 2.9 3.2 3.2 3.2
3.2 2.9 3.1 3.0 3.9 4.1 4.0 3.5 3.7 3.9 3.6 3.5 3.3 3.2 3.2 3.3 3.7 3.5 3.4 3.5 3.6 3.7 3.5 3.2 3.5 3.8 3.8 3.8 3.7 3.6 3.4 3.5 3.1 3.0 2.9 3.2
3.4 3.5 3.6 3.4 3.5 3.9 4.1 4.4 4.4 4.5 4.7 4.6 4.6 4.0 3.8 3.5 3.8 3.7 3.7 4.1 3.8 3.6 3.2 3.7 4.1 4.0 4.7 5.4 5.5 5.0 4.1 3.9 3.6 3.8 4.0 3.7
3.3 3.6 3.7 3.3 3.3 3.6 4.6 5.2 5.2 4.8 4.2 3.6 3.9 3.6 3.7 3.6 3.7 3.9 4.0 4.2 4.2 4.2 4.0 3.6 4.2 6.3 5.0 4.3 4.4 4.0 4.0 4.2 4.5 4.5 4.0 3.9
3.6 3.4 3.5 3.3 3.4 3.4 3.5 3.8 4.0 3.8 3.4 3.4 3.6 3.6 3.6 3.6 3.6 4.0 4.0 5.0 4.7 4.3 3.9 4.0 4.1 3.9 6.2 4.9 4.1 3.8 3.8 3.5 3.6 3.8 3.4 3.8
3.5 3.2 3.3 3.3 3.4 3.4 3.4 3.5 3.5 3.4 3.4 3.4 3.4 3.3 3.5 3.4 3.5 3.8 3.7 4.3 4.6 4.0 3.6 3.5 3.5 3.5 3.5 3.4 3.7 3.3 3.3 3.3 3.3 3.5 3.2 3.4
3.4 3.2 3.3 3.4 3.3 3.3 3.3 3.3 3.4 3.4 3.3 3.7 3.3 3.3 3.3 3.3 3.3 3.7 3.2 4.0 4.2 3.8 3.5 3.3 3.5 3.4 3.4 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.2
3.4 3.3 3.3 3.4 3.4 3.3 3.4 3.3 3.3 3.3 3.2 3.5 3.3 3.3 3.3 3.3 3.3 3.4 3.2 3.5 3.4 3.3 3.4 3.4 3.5 3.4 3.4 3.3 3.4 3.3 3.4 3.4 3.3 3.1 3.3 3.3
3.4 3.4 3.4 3.4 3.4 3.4 3.4 3.3 3.4 3.3 3.5 3.9 3.6 3.3 3.3 3.4 3.3 3.3 3.2 3.5 3.3 3.3 3.4 3.3 3.3 3.3 3.3 3.3 3.5 3.4 3.5 3.5 3.3 3.2 3.5 3.2
3.5 3.6 3.4 3.4 3.5 3.4 3.5 3.4 3.5 3.4 3.4 4.6 3.6 3.4 3.3 3.4 3.6 3.3 3.4 3.4 4.0 3.4 3.5 3.4 3.5 3.3 3.5 3.6 3.6 4.0 3.8 3.7 3.7 3.5 3.6 3.4
3.5 3.6 3.5 3.5 3.6 3.6 3.9 3.9 3.7 3.5 3.9 4.4 4.1 4.1 3.8 3.8 4.2 3.9 3.8 3.5 3.8 3.8 3.6 3.5 3.6 3.7 3.9 3.7 3.3 3.6 3.6 3.8 3.7 3.4 3.6 3.9
3.4 3.4 3.5 3.4 3.4 3.4 3.7 3.8 3.6 3.7 3.8 3.9 4.0 4.1 3.9 4.0 3.7 4.3 4.1 3.9 4.2 4.2 4.0 3.8 3.8 3.7 3.7 3.8 3.8 3.7 3.6 3.6 3.6 3.6 3.8 4.0
3.2 3.3 3.6 3.2 3.2 3.3 3.1 3.1 3.5 3.7 3.2 3.0 3.2 3.1 3.0 3.1 2.9 3.0 3.1 2.9 3.0 3.1 3.1 3.4 3.4 2.9 3.0 3.0 3.2 3.4 3.0 3.2 3.4 3.4 3.3 3.3
2.8 3.0 2.8 2.9 3.0 3.0 2.8 2.8 2.9 3.0 3.0 3.2 3.0 3.0 2.9 3.0 2.9 2.7 2.8 2.8 2.8 3.0 3.7 4.3 3.7 2.9 3.7 4.3 4.5 4.2 4.3 4.6 4.0 3.4 3.2 3.0
2.5 2.6 2.7 3.0 3.4 3.7 3.7 3.7 3.8 3.6 3.1 2.7 2.7 2.7 2.8 3.0 3.1 3.1 3.3 3.7 4.3 3.9 3.0 2.2 3.2 3.5 2.7 2.5 2.3 2.3 2.0 1.9 2.3 2.5 2.9 2.7
3.7 3.6 3.7 3.7 3.6 3.5 3.6 3.2 2.6 2.6 3.1 3.4 3.5 3.5 3.4 3.0 2.7 2.3 2.0 1.9 1.9 1.9 1.9 1.8 1.8 1.8 1.8 1.7 1.6 1.6 1.6 1.6 1.8 2.3 3.6 3.6
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S

Figure 30. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



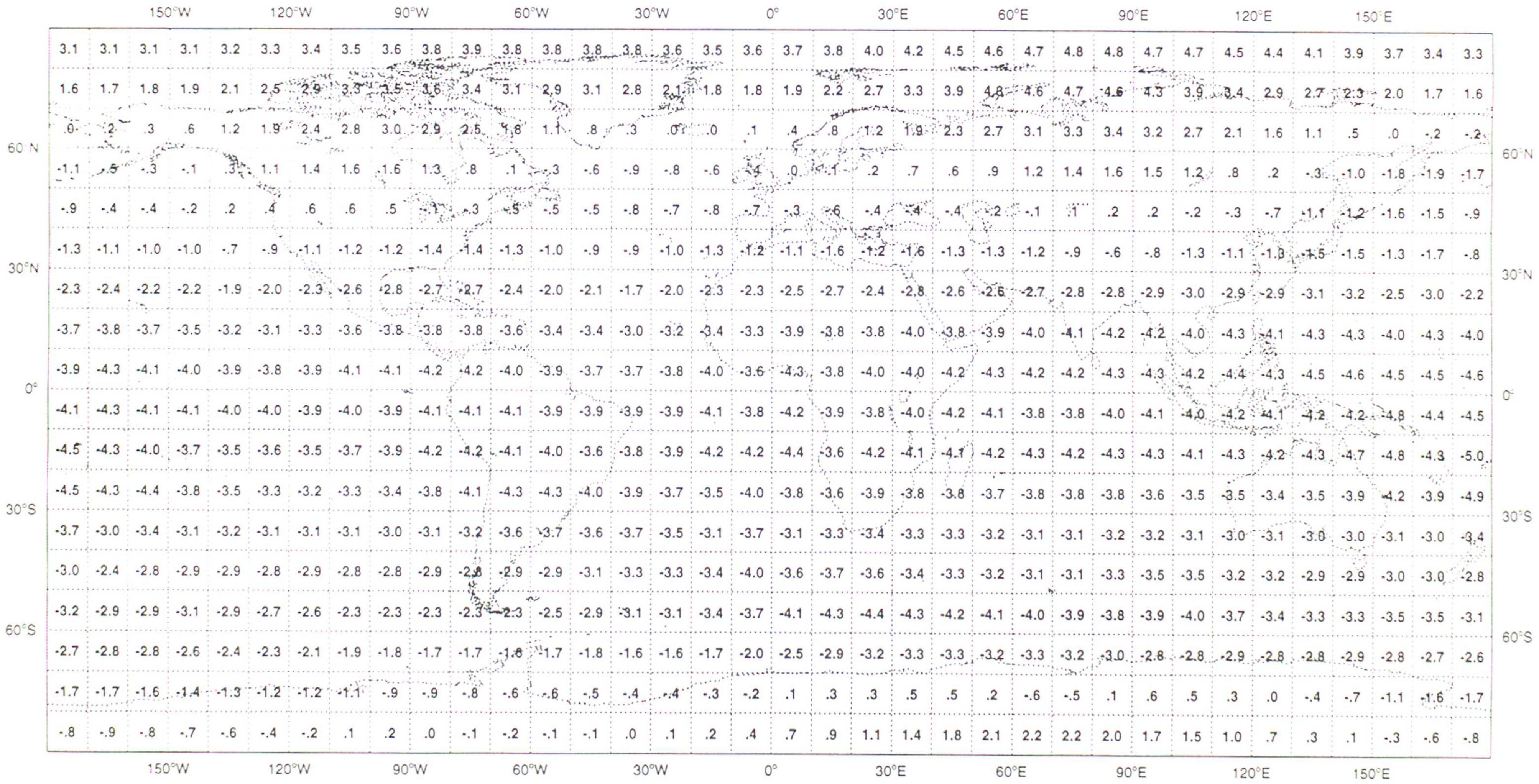
7.0	7.3	7.8	8.2	8.7	9.3	9.8	10.2	10.8	12.3	14.3	12.2	13.0	14.0	14.4	11.9	10.2	9.2	8.6	8.7	8.9	8.6	8.4	8.3	8.4	8.3	8.2	8.2	8.2	8.1	8.0	7.8	7.6	7.2	7.0	7.0
4.9	4.8	5.0	5.5	6.7	8.1	9.3	10.0	10.7	11.8	11.7	11.3	13.5	19.5	18.4	10.7	6.4	4.7	3.9	4.8	5.4	5.3	5.7	6.8	7.5	7.9	7.8	7.7	7.5	7.2	7.2	7.1	6.7	6.0	5.4	5.2
4.7	3.8	3.2	4.5	6.3	7.3	8.6	10.3	10.6	10.4	10.1	9.1	5.7	10.4	6.0	3.3	2.5	1.8	2.2	2.8	3.0	3.9	4.8	5.7	6.7	7.1	7.0	7.6	7.3	7.4	7.9	10.1	10.4	7.9	6.6	5.7
2.6	2.2	1.1	1.1	2.8	5.3	6.2	7.2	7.9	8.1	7.2	6.2	4.0	2.4	1.9	1.1	.5	.1	.2	.1	.2	2.0	2.5	3.3	3.2	3.4	3.8	4.3	4.9	5.7	6.2	7.6	6.6	4.9	3.9	2.8
.1	.3	.2	.0	-.4	.6	2.9	3.4	3.3	2.7	2.7	1.6	.6	.2	.1	-.4	-1.1	-1.8	-1.3	-1.3	.5	.9	1.0	.8	.7	.7	.2	.4	-.4	1.4	2.1	2.7	3.2	2.2	1.7	1.4
-3.1	-1.9	-1.9	-2.4	-3.3	-5.0	-4.9	-3.7	-2.9	-2.4	-3.0	-3.6	-2.5	-3.0	-2.5	-2.8	-3.8	-4.8	-4.7	-4.7	-3.2	-3.0	-3.0	-3.3	-3.4	-.3	1.9	.7	-2.3	-2.1	-2.7	-2.6	-2.1	-1.5	-2.7	-2.3
-8.1	-6.8	-5.3	-5.9	-6.2	-6.3	-7.2	-6.0	-8.3	-9.4	-8.7	-7.3	-6.7	-8.1	-7.1	-7.9	-8.1	-8.2	-8.8	-9.7	-9.7	-9.8	-7.8	-6.8	-8.1	-8.2	-6.7	-6.0	-5.4	-4.7	-5.5	-6.3	-6.7	-6.5	-8.2	-9.3
-10.2	-7.9	-7.2	-6.4	-5.0	-3.8	-6.8	-11.1	-13.0	-13.2	-11.6	-9.9	-9.3	-9.2	-7.7	-6.8	-6.6	-6.9	-9.3	-10.7	-11.9	-9.4	-8.3	-11.3	-11.6	-10.7	-12.0	-11.1	-9.2	-10.8	-10.8	-11.4	-11.9	-12.1	-12.8	-12.4
-5.2	-5.2	-5.7	-6.2	-6.1	-6.2	-8.3	-9.6	-8.5	-7.4	-5.2	-5.1	-5.0	-3.6	-4.1	-4.8	-4.8	-4.9	-6.1	-6.6	-5.3	-4.2	-8.9	-9.6	-8.2	-6.9	-6.0	-5.9	-7.0	-6.7	-6.4	-7.6	-8.2	-7.8	-8.6	-7.6
-5.5	-6.4	-6.5	-7.1	-8.6	-8.4	-7.4	-6.6	-5.7	-4.2	-2.0	-2.7	-3.0	-4.6	-5.6	-6.1	-6.2	-4.6	-3.0	-2.0	-2.2	-5.0	-6.1	-4.0	-2.9	-3.1	-3.7	-4.1	-4.0	-3.8	-3.6	-4.6	-3.2	-2.7	-3.2	-4.7
-6.4	-6.1	-6.3	-6.5	-8.0	-9.6	-10.8	-10.3	-10.2	-10.1	-6.5	-4.9	-5.2	-6.3	-8.8	-11.5	-12.9	-11.7	-8.1	-4.4	-7.4	-7.3	-5.1	-5.7	-7.1	-7.6	-6.2	-6.8	-7.6	-8.1	-7.6	-9.1	-9.3	-8.3	-7.6	-8.2
-9.0	-8.0	-8.4	-5.3	-5.0	-6.2	-7.8	-7.8	-8.7	-11.2	-11.8	-8.3	-6.8	-8.3	-7.6	-9.2	-10.7	-12.4	-11.8	-9.3	-9.5	-10.6	-8.8	-8.1	-8.7	-8.7	-8.2	-8.8	-8.8	-7.5	-7.0	-10.2	-10.7	-11.3	-10.6	-11.2
-6.4	-5.3	-6.2	-5.0	-4.3	-4.1	-3.9	-4.2	-4.5	-4.7	-5.5	-5.8	-5.1	-4.3	-4.3	-4.1	-4.2	-5.0	-5.5	-6.6	-6.9	-6.3	-6.6	-6.5	-6.4	-6.3	-6.1	-6.2	-6.0	-6.1	-6.1	-7.3	-7.1	-6.5	-6.4	-6.8
-3.0	-1.8	-1.9	-2.3	-2.2	-1.4	-1.0	-1.0	-1.4	-1.4	-.8	-1.3	-1.5	-1.2	-1.5	-1.3	-.7	-1.1	-.9	-1.5	-1.8	-1.9	-1.6	-1.5	-1.6	-1.6	-1.4	-1.4	-1.8	-1.9	-2.6	-2.4	-2.4	-2.3	-2.0	-1.7
.5	.5	.4	.1	.4	.8	.8	.8	.7	1.0	1.2	1.1	1.1	1.4	1.9	2.4	1.7	1.9	2.2	1.5	1.4	1.3	1.1	1.1	1.1	1.1	1.1	.7	.8	.9	.3	.4	.7	.6	1.0	1.1
2.5	1.9	2.0	1.6	1.6	1.3	1.6	2.0	1.9	2.0	2.2	3.3	3.9	3.7	3.8	4.0	3.4	3.8	4.0	3.2	3.4	4.0	4.8	6.1	4.9	4.2	5.3	5.7	5.5	4.4	4.7	5.7	4.3	3.4	2.9	2.8
4.2	4.0	4.1	4.9	5.5	5.6	5.1	5.0	6.4	6.4	6.0	7.0	5.8	5.6	5.5	6.9	8.9	13.3	17.0	20.0	21.4	24.3	27.4	26.3	18.9	19.3	25.0	29.2	27.8	27.4	26.6	24.4	21.8	17.2	8.2	4.9
10.4	9.2	9.1	9.9	10.9	11.3	12.6	15.2	15.7	13.1	11.0	10.2	10.7	11.4	13.3	15.5	17.5	19.8	21.8	23.7	25.0	27.7	31.6	34.4	35.7	36.3	35.1	33.5	31.6	29.6	27.2	24.9	22.7	19.1	13.3	11.2

Figure 31. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



3.5	3.5	3.3	3.3	3.2	3.1	2.9	2.7	2.8	3.4	4.3	3.0	3.6	4.3	4.5	3.6	2.9	2.6	2.8	2.9	2.8	2.7	2.5	2.4	2.2	2.1	2.1	2.0	2.0	2.3	2.4	2.5	2.7	3.0	3.2	3.3
3.5	3.7	4.0	4.3	4.1	3.8	3.4	2.7	2.6	2.8	3.4	3.8	6.1	5.9	5.8	4.6	3.3	2.9	2.6	3.1	2.8	2.9	2.6	2.2	2.1	2.1	2.0	2.2	2.5	2.5	2.5	2.5	2.7	3.2	3.5	3.3
2.8	3.0	3.5	4.1	4.0	4.0	3.5	3.1	3.6	3.5	3.8	4.1	3.9	6.4	6.3	3.6	3.1	3.1	3.2	3.1	3.2	2.8	2.6	2.6	2.8	2.6	2.8	3.1	2.4	2.5	2.8	2.8	2.9	2.8	2.7	2.7
3.0	2.8	3.3	3.5	3.5	3.3	3.4	3.4	3.6	4.0	3.8	3.4	3.2	3.3	3.2	3.5	3.5	3.5	3.5	3.2	4.0	3.3	2.9	2.7	3.2	3.6	3.4	3.1	2.7	2.8	3.0	3.3	2.8	2.4	2.6	3.0
3.8	4.0	3.8	3.7	4.2	4.1	3.0	3.3	3.5	3.7	3.8	3.4	3.8	3.7	3.4	3.4	4.3	4.8	4.2	4.3	4.3	3.6	2.9	3.1	3.4	3.9	4.4	5.2	5.3	4.3	3.7	3.6	3.1	3.3	3.1	3.5
4.6	4.2	4.0	4.2	4.5	4.9	4.9	4.8	4.7	4.4	4.9	4.7	4.1	4.4	4.0	4.2	4.4	5.2	4.2	4.3	4.6	4.4	4.8	4.3	4.7	5.8	5.0	4.2	4.4	4.5	4.7	4.8	4.4	4.4	4.4	4.6
5.0	4.6	4.6	4.4	4.8	5.4	6.4	5.1	5.0	4.6	4.4	5.2	5.2	5.2	4.9	3.9	4.3	5.4	4.8	4.1	4.5	4.3	5.1	5.3	5.6	5.3	5.5	4.8	4.2	4.5	4.4	4.8	4.6	4.6	4.2	4.9
4.4	4.7	4.5	4.9	5.0	3.9	3.8	3.6	3.4	3.1	3.8	4.6	5.0	4.8	5.3	5.5	4.0	4.1	3.6	3.8	4.0	4.6	4.1	3.6	4.3	3.5	3.5	4.2	4.5	4.0	4.1	3.5	3.2	3.0	3.2	3.3
3.6	3.3	3.2	3.3	3.2	3.2	2.9	3.2	3.7	3.7	3.7	3.7	3.8	3.1	3.2	3.1	3.0	3.3	3.7	3.9	4.0	3.4	4.0	4.5	4.6	4.2	4.6	3.8	3.9	4.0	4.3	4.6	4.6	4.7	5.2	5.0
2.8	2.9	3.2	3.4	2.9	2.9	3.2	3.1	3.1	2.7	1.9	2.3	2.9	4.0	4.1	3.8	3.7	3.0	2.3	2.0	2.6	3.7	3.3	2.8	2.2	2.3	2.8	3.0	2.8	2.6	2.8	3.3	2.6	1.7	2.1	2.9
3.4	3.1	3.7	3.9	3.5	3.8	3.4	3.7	3.2	4.4	5.0	3.4	3.2	4.3	3.6	3.1	2.9	3.8	4.5	3.7	4.5	4.5	3.7	3.5	4.1	4.0	3.4	4.1	4.2	3.8	3.3	3.3	4.0	4.6	4.4	4.3
4.3	4.5	4.9	4.6	4.3	4.8	4.1	4.2	4.2	3.4	4.2	3.9	3.9	4.8	4.3	3.6	3.5	3.3	3.5	4.4	4.1	4.5	4.5	5.5	5.3	4.5	4.3	5.0	4.8	4.9	5.1	4.8	3.9	4.6	5.2	4.5
5.3	4.8	4.6	4.9	5.1	5.2	4.7	4.6	4.6	4.2	4.8	4.3	4.5	4.7	4.7	4.8	4.8	4.6	4.7	4.5	4.8	4.6	4.2	4.1	4.2	4.5	4.4	4.3	4.4	4.5	4.5	5.0	4.5	4.6	4.8	5.3
4.0	3.8	3.8	3.9	3.8	3.8	3.7	4.0	4.1	3.6	3.4	3.8	3.8	3.8	3.8	4.0	3.5	3.6	3.9	3.9	4.2	3.9	3.7	3.6	3.7	3.9	3.8	3.8	4.2	4.4	4.2	4.2	3.9	3.7	3.8	4.4
2.9	3.2	3.3	3.1	3.2	3.1	3.0	2.9	3.5	3.4	3.2	3.1	3.4	3.0	3.1	3.0	3.0	3.1	3.2	3.1	2.9	3.0	2.9	2.8	2.8	2.9	2.9	3.3	3.1	3.0	3.0	3.0	3.0	3.0	3.0	3.1
2.8	3.0	2.9	3.2	3.0	2.9	3.0	2.9	3.0	2.8	2.6	3.0	2.4	2.3	2.5	2.7	2.9	2.7	2.5	2.5	2.6	2.7	3.8	5.3	4.1	2.8	4.2	5.3	5.4	4.8	5.5	6.0	4.2	2.8	2.7	2.8
2.4	2.4	2.5	3.0	3.7	3.8	3.8	4.1	4.5	4.3	3.4	2.9	2.6	2.7	2.9	4.0	4.8	5.7	6.8	8.1	9.7	9.8	8.5	6.0	8.0	8.5	7.7	8.0	7.1	7.2	6.3	5.4	6.2	5.8	4.3	2.5
6.6	5.7	5.5	5.5	5.4	5.3	5.6	5.6	4.6	4.2	4.9	5.4	5.7	6.0	6.3	6.0	5.9	5.5	5.0	4.8	4.3	4.6	5.2	5.3	5.4	5.8	5.5	5.0	4.5	4.3	3.8	3.9	4.5	5.2	7.3	6.9

Figure 32. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2002
Channel: HIRS4 (400 hPa)
NOAA15, using all observations



3.1	3.1	3.1	3.1	3.2	3.3	3.4	3.5	3.6	3.8	3.9	3.8	3.8	3.8	3.8	3.6	3.5	3.6	3.7	3.8	4.0	4.2	4.5	4.6	4.7	4.8	4.8	4.7	4.7	4.5	4.4	4.1	3.9	3.7	3.4	3.3
1.6	1.7	1.8	1.9	2.1	2.5	2.9	3.3	3.5	3.6	3.4	3.1	2.9	3.1	2.8	2.1	1.8	1.8	1.9	2.2	2.7	3.3	3.9	4.8	4.6	4.7	4.6	4.3	3.9	3.4	2.9	2.7	2.3	2.0	1.7	1.6
.0	.2	.3	.6	1.2	1.9	2.4	2.8	3.0	2.9	2.5	1.8	1.1	.8	.3	.0	.0	.1	.4	.8	1.2	1.9	2.3	2.7	3.1	3.3	3.4	3.2	2.7	2.1	1.6	1.1	.5	.0	-.2	-.2
-1.1	-.5	-.3	-.1	.3	1.1	1.4	1.6	1.6	1.3	.8	.1	-.3	-.6	-.9	-.8	-.6	-.4	.0	-.1	.2	.7	.6	.9	1.2	1.4	1.6	1.5	1.2	.8	.2	-.3	-1.0	-1.8	-1.9	-1.7
-.9	-.4	-.4	-.2	.2	.4	.6	.6	.5	-.1	-.3	-.5	-.5	-.5	-.8	-.7	-.8	-.7	-.3	-.6	-.4	-.4	-.4	-.2	-.1	.1	.2	.2	-.2	-.3	-.7	-1.1	-1.2	-1.6	-1.5	-.9
-1.3	-1.1	-1.0	-1.0	-.7	-.9	-1.1	-1.2	-1.2	-1.4	-1.4	-1.3	-1.0	-.9	-.9	-1.0	-1.3	-1.2	-1.1	-1.6	-1.2	-1.6	-1.3	-1.3	-1.2	-.9	-.6	-.8	-1.3	-1.1	-1.3	-1.5	-1.5	-1.3	-1.7	-.8
-2.3	-2.4	-2.2	-2.2	-1.9	-2.0	-2.3	-2.6	-2.8	-2.7	-2.7	-2.4	-2.0	-2.1	-1.7	-2.0	-2.3	-2.3	-2.5	-2.7	-2.4	-2.8	-2.6	-2.6	-2.7	-2.8	-2.8	-2.9	-3.0	-2.9	-2.9	-3.1	-3.2	-2.5	-3.0	-2.2
-3.7	-3.8	-3.7	-3.5	-3.2	-3.1	-3.3	-3.6	-3.8	-3.8	-3.8	-3.6	-3.4	-3.4	-3.0	-3.2	-3.4	-3.3	-3.9	-3.8	-3.8	-4.0	-3.8	-3.9	-4.0	-4.1	-4.2	-4.2	-4.0	-4.3	-4.1	-4.3	-4.3	-4.0	-4.3	-4.0
-3.9	-4.3	-4.1	-4.0	-3.9	-3.8	-3.9	-4.1	-4.1	-4.2	-4.2	-4.0	-3.9	-3.7	-3.7	-3.8	-4.0	-3.6	-4.3	-3.8	-4.0	-4.0	-4.2	-4.3	-4.2	-4.2	-4.3	-4.3	-4.2	-4.4	-4.3	-4.5	-4.6	-4.5	-4.5	-4.6
-4.1	-4.3	-4.1	-4.1	-4.0	-4.0	-3.9	-4.0	-3.9	-4.1	-4.1	-4.1	-3.9	-3.9	-3.9	-3.9	-4.1	-3.8	-4.2	-3.9	-3.8	-4.0	-4.2	-4.1	-3.8	-3.8	-4.0	-4.1	-4.0	-4.2	-4.1	-4.2	-4.2	-4.8	-4.4	-4.5
-4.5	-4.3	-4.0	-3.7	-3.5	-3.6	-3.5	-3.7	-3.9	-4.2	-4.2	-4.1	-4.0	-3.6	-3.8	-3.9	-4.2	-4.2	-4.4	-3.6	-4.2	-4.1	-4.1	-4.2	-4.3	-4.2	-4.3	-4.3	-4.1	-4.3	-4.2	-4.3	-4.7	-4.8	-4.3	-5.0
-4.5	-4.3	-4.4	-3.8	-3.5	-3.3	-3.2	-3.3	-3.4	-3.8	-4.1	-4.3	-4.3	-4.0	-3.9	-3.7	-3.5	-4.0	-3.8	-3.6	-3.9	-3.8	-3.8	-3.7	-3.8	-3.8	-3.8	-3.6	-3.5	-3.5	-3.4	-3.5	-3.9	-4.2	-3.9	-4.9
-3.7	-3.0	-3.4	-3.1	-3.2	-3.1	-3.1	-3.1	-3.0	-3.1	-3.2	-3.6	-3.7	-3.6	-3.7	-3.5	-3.1	-3.7	-3.1	-3.3	-3.4	-3.3	-3.3	-3.2	-3.1	-3.1	-3.2	-3.2	-3.1	-3.0	-3.1	-3.0	-3.0	-3.1	-3.0	-3.4
-3.0	-2.4	-2.8	-2.9	-2.9	-2.8	-2.9	-2.8	-2.8	-2.9	-2.8	-2.9	-2.9	-3.1	-3.3	-3.3	-3.4	-4.0	-3.6	-3.7	-3.6	-3.4	-3.3	-3.2	-3.1	-3.1	-3.3	-3.5	-3.5	-3.2	-3.2	-2.9	-2.9	-3.0	-3.0	-2.8
-3.2	-2.9	-2.9	-3.1	-2.9	-2.7	-2.6	-2.3	-2.3	-2.3	-2.3	-2.3	-2.5	-2.9	-3.1	-3.1	-3.4	-3.7	-4.1	-4.3	-4.4	-4.3	-4.2	-4.1	-4.0	-3.9	-3.8	-3.9	-4.0	-3.7	-3.4	-3.3	-3.3	-3.5	-3.5	-3.1
-2.7	-2.8	-2.8	-2.6	-2.4	-2.3	-2.1	-1.9	-1.8	-1.7	-1.7	-1.6	-1.7	-1.8	-1.6	-1.6	-1.7	-2.0	-2.5	-2.9	-3.2	-3.3	-3.3	-3.2	-3.3	-3.2	-3.0	-2.8	-2.8	-2.9	-2.8	-2.8	-2.9	-2.8	-2.7	-2.6
-1.7	-1.7	-1.6	-1.4	-1.3	-1.2	-1.2	-1.1	-.9	-.9	-.8	-.6	-.6	-.5	-.4	-.4	-.3	-.2	.1	.3	.3	.5	.5	.2	-.6	-.5	.1	.6	.5	.3	.0	-.4	-.7	-1.1	-1.6	-1.7
-.8	-.9	-.8	-.7	-.6	-.4	-.2	.1	.2	.0	-.1	-.2	-.1	-.1	.0	.1	.2	.4	.7	.9	1.1	1.4	1.8	2.1	2.2	2.2	2.0	1.7	1.5	1.0	.7	.3	.1	-.3	-.6	-.8

Figure 33. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2002
Channel: HIRS4 (400 hPa)
NOAA15, using all observations

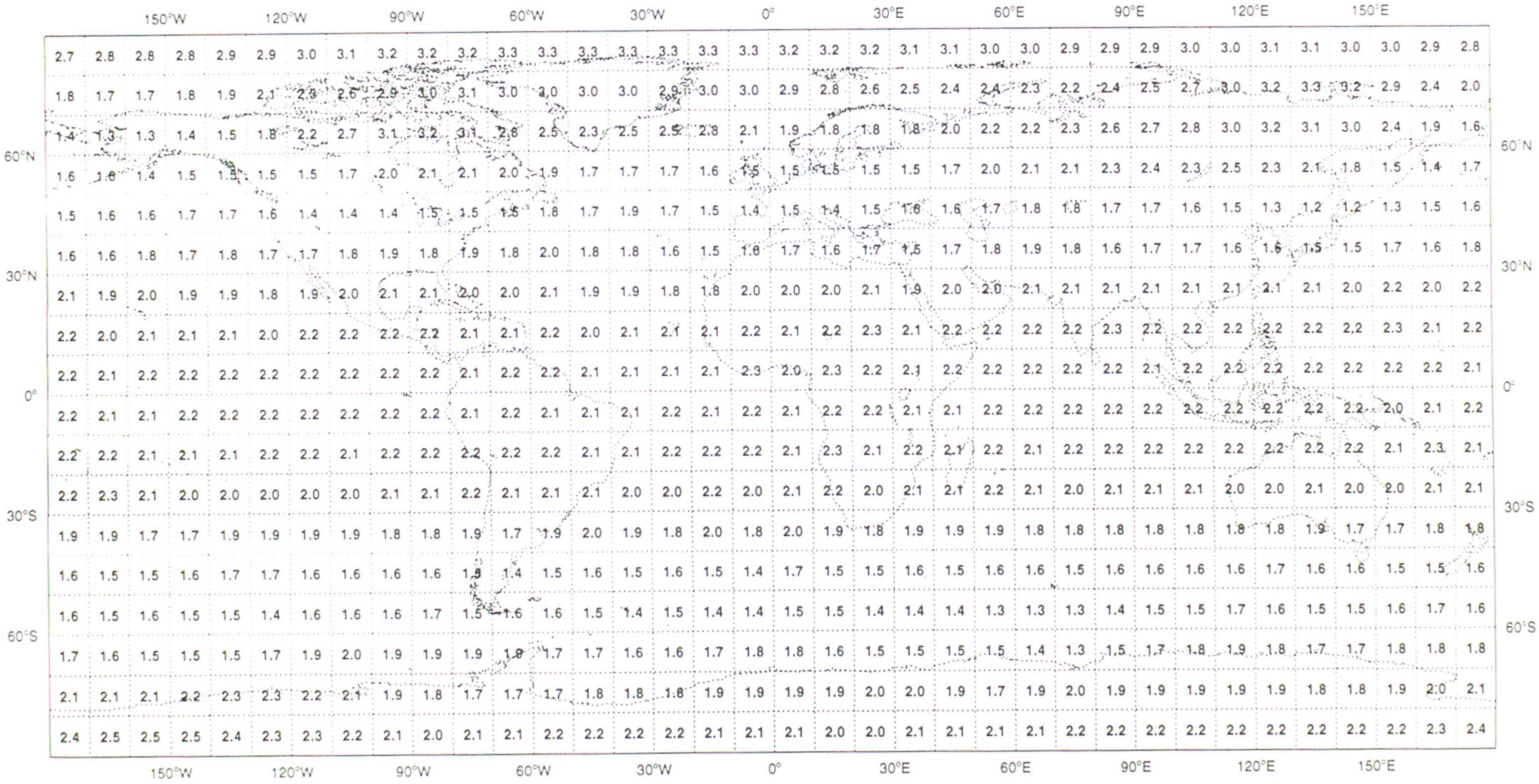
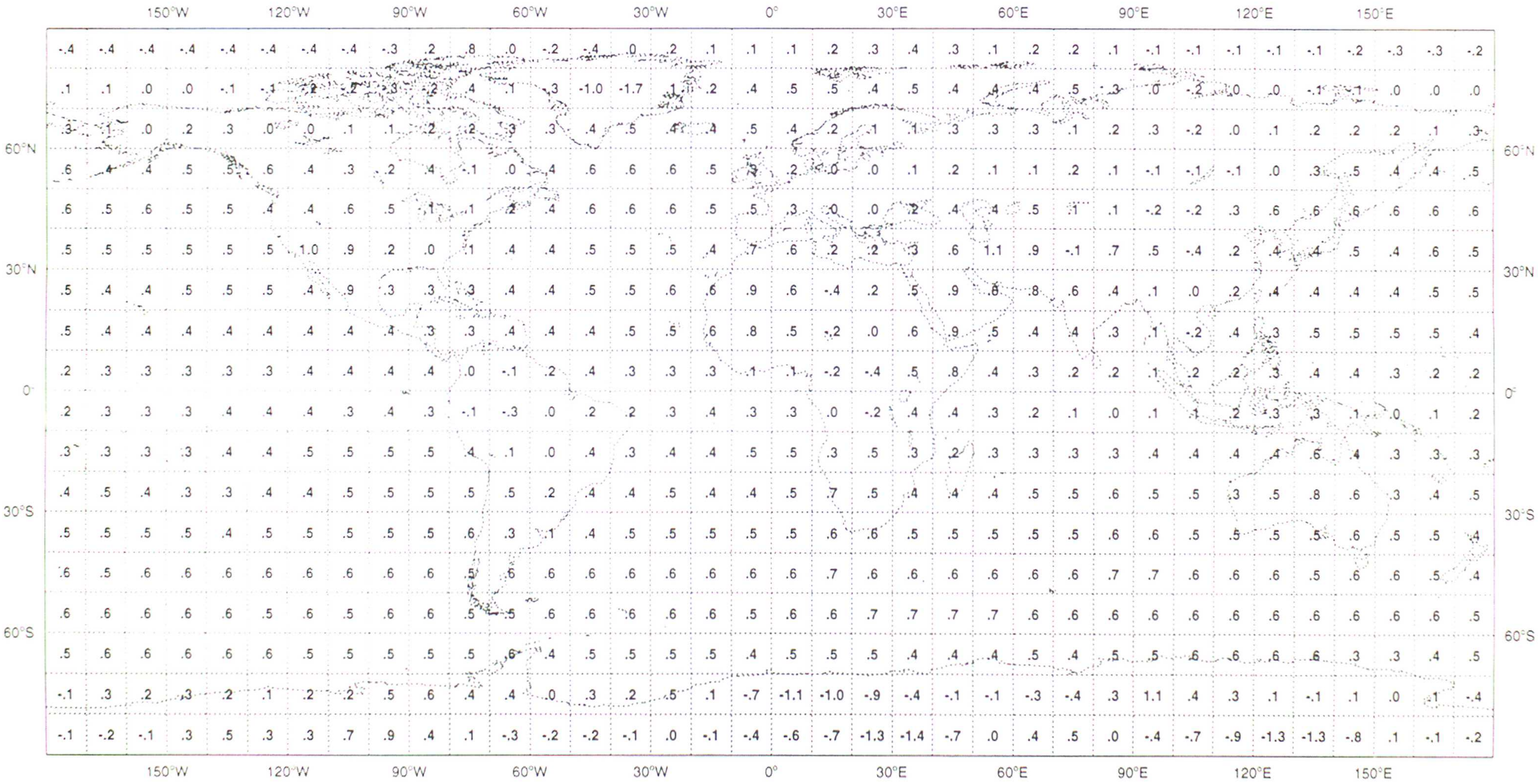

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
2.7 2.8 2.8 2.8 2.9 2.9 3.0 3.1 3.2 3.2 3.2 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.2 3.2 3.2 3.1 3.1 3.0 3.0 2.9 2.9 2.9 3.0 3.0 3.1 3.1 3.0 3.0 2.9 2.8
1.8 1.7 1.7 1.8 1.9 2.1 2.3 2.6 2.9 3.0 3.1 3.0 3.0 3.0 3.0 2.9 3.0 3.0 2.9 2.8 2.6 2.5 2.4 2.4 2.3 2.2 2.4 2.5 2.7 3.0 3.2 3.3 3.2 2.9 2.4 2.0
1.4 1.3 1.3 1.4 1.5 1.8 2.2 2.7 3.1 3.2 3.1 2.8 2.5 2.3 2.5 2.5 2.8 2.1 1.9 1.8 1.8 1.8 2.0 2.2 2.2 2.3 2.6 2.7 2.8 3.0 3.2 3.1 3.0 2.4 1.9 1.6
1.6 1.6 1.4 1.5 1.5 1.5 1.5 1.7 2.0 2.1 2.1 2.0 1.9 1.7 1.7 1.7 1.6 1.5 1.5 1.5 1.5 1.5 1.7 2.0 2.1 2.1 2.3 2.4 2.3 2.5 2.3 2.1 1.8 1.5 1.4 1.7
1.5 1.6 1.6 1.7 1.7 1.6 1.4 1.4 1.4 1.5 1.5 1.5 1.8 1.7 1.9 1.7 1.5 1.4 1.5 1.4 1.5 1.6 1.6 1.7 1.8 1.8 1.7 1.7 1.6 1.5 1.3 1.2 1.2 1.3 1.5 1.6
1.6 1.6 1.8 1.7 1.8 1.7 1.7 1.8 1.9 1.8 1.9 1.8 2.0 1.8 1.8 1.6 1.5 1.6 1.7 1.6 1.7 1.5 1.7 1.8 1.9 1.8 1.6 1.7 1.7 1.6 1.6 1.5 1.5 1.7 1.6 1.8
2.1 1.9 2.0 1.9 1.9 1.8 1.9 2.0 2.1 2.1 2.0 2.0 2.1 1.9 1.9 1.8 1.8 2.0 2.0 2.0 2.1 1.9 2.0 2.0 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.0 2.2 2.0 2.2
2.2 2.0 2.1 2.1 2.1 2.0 2.2 2.2 2.2 2.2 2.1 2.1 2.2 2.0 2.1 2.1 2.1 2.2 2.1 2.2 2.3 2.1 2.2 2.2 2.2 2.2 2.3 2.2 2.2 2.2 2.2 2.2 2.2 2.3 2.1 2.2
2.2 2.1 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.1 2.2 2.2 2.1 2.1 2.1 2.1 2.3 2.0 2.3 2.2 2.1 2.2 2.2 2.2 2.2 2.2 2.1 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.1
2.2 2.1 2.1 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.1 2.2 2.1 2.1 2.1 2.2 2.1 2.2 2.1 2.2 2.2 2.1 2.1 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.0 2.1 2.2
2.2 2.2 2.1 2.1 2.1 2.2 2.2 2.1 2.2 2.2 2.2 2.2 2.2 2.1 2.1 2.2 2.2 2.2 2.1 2.3 2.1 2.2 2.1 2.2 2.1 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.1 2.3 2.1
2.2 2.3 2.1 2.0 2.0 2.0 2.0 2.0 2.1 2.1 2.2 2.1 2.1 2.1 2.0 2.0 2.2 2.0 2.1 2.2 2.0 2.1 2.1 2.2 2.1 2.0 2.1 2.1 2.1 2.0 2.0 2.1 2.0 2.0 2.1 2.1
1.9 1.9 1.7 1.7 1.9 1.9 1.9 1.9 1.8 1.8 1.9 1.7 1.9 2.0 1.9 1.8 2.0 1.8 2.0 1.9 1.8 1.9 1.9 1.9 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.9 1.7 1.7 1.8 1.8
1.6 1.5 1.5 1.6 1.7 1.7 1.6 1.6 1.6 1.6 1.5 1.4 1.5 1.6 1.5 1.6 1.5 1.4 1.7 1.5 1.5 1.6 1.5 1.6 1.6 1.5 1.6 1.6 1.6 1.6 1.7 1.6 1.6 1.5 1.5 1.6
1.6 1.5 1.6 1.5 1.5 1.4 1.6 1.6 1.6 1.7 1.5 1.6 1.6 1.5 1.4 1.5 1.4 1.4 1.5 1.5 1.4 1.4 1.4 1.3 1.3 1.3 1.4 1.5 1.5 1.7 1.6 1.5 1.5 1.6 1.7 1.6
1.7 1.6 1.5 1.5 1.5 1.7 1.9 2.0 1.9 1.9 1.9 1.8 1.7 1.7 1.6 1.6 1.7 1.8 1.8 1.6 1.5 1.5 1.5 1.5 1.4 1.3 1.5 1.7 1.8 1.9 1.8 1.7 1.7 1.8 1.8 1.8
2.1 2.1 2.1 2.2 2.3 2.3 2.2 2.1 1.9 1.8 1.7 1.7 1.7 1.8 1.8 1.8 1.9 1.9 1.9 1.9 2.0 2.0 1.9 1.7 1.9 2.0 1.9 1.9 1.9 1.9 1.9 1.8 1.8 1.9 2.0 2.1
2.4 2.5 2.5 2.5 2.4 2.3 2.3 2.2 2.1 2.0 2.1 2.1 2.2 2.2 2.2 2.2 2.1 2.1 2.1 2.0 2.0 2.1 2.1 2.1 2.1 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.3 2.4

Figure 34. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2002
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations



-.4	-.4	-.4	-.4	-.4	-.4	-.4	-.4	-.3	.2	.8	.0	-.2	-.4	.0	.2	.1	.1	.1	.2	.3	.4	.3	.1	.2	.2	.1	-.1	-.1	-.1	-.1	-.1	-.2	-.3	-.3	-.2
.1	.1	.0	.0	-.1	-.1	.2	-.2	.3	.2	.4	.1	.3	-1.0	-1.7	.1	.2	.4	.5	.5	.4	.5	.4	.4	.4	.5	.3	.0	-.2	.0	.0	-.1	-.1	.0	.0	.0
.3	.1	.0	.2	.3	.0	.0	.1	.1	.2	.2	.3	.3	.4	.5	.4	.4	.5	.4	.2	.1	.1	.3	.3	.3	.1	.2	.3	-.2	.0	.1	.2	.2	.2	.1	.3
.6	.4	.4	.5	.5	.6	.4	.3	.2	.4	-.1	.0	.4	.6	.6	.6	.5	.3	.2	.0	.0	.1	.2	.1	.1	.2	.1	-.1	-.1	-.1	.0	.3	.5	.4	.4	.5
.6	.5	.6	.5	.5	.4	.4	.6	.5	.1	.1	.2	.4	.6	.6	.6	.5	.5	.3	.0	.0	.2	.4	.4	.5	.1	.1	-.2	-.2	.3	.6	.6	.6	.6	.6	.6
.5	.5	.5	.5	.5	.5	1.0	.9	.2	.0	.1	.4	.4	.5	.5	.5	.4	.7	.6	.2	.2	.3	.6	1.1	.9	-.1	.7	.5	-.4	.2	.4	.4	.5	.4	.6	.5
.5	.4	.4	.5	.5	.5	.4	.9	.3	.3	.3	.4	.4	.5	.5	.6	.6	.9	.6	-.4	.2	.5	.9	.8	.8	.6	.4	.1	.0	.2	.4	.4	.4	.4	.5	.5
.5	.4	.4	.4	.4	.4	.4	.4	.4	.3	.3	.4	.4	.4	.5	.5	.6	.8	.5	-.2	.0	.6	.9	.5	.4	.4	.3	.1	-.2	.4	.3	.5	.5	.5	.5	.4
.2	.3	.3	.3	.3	.3	.4	.4	.4	.4	.0	-.1	.2	.4	.3	.3	.3	.1	.1	-.2	-.4	.5	.8	.4	.3	.2	.2	.1	.2	.2	.3	.4	.4	.3	.2	.2
.2	.3	.3	.3	.4	.4	.4	.3	.4	.3	-.1	-.3	.0	.2	.2	.3	.4	.3	.3	.0	-.2	.4	.4	.3	.2	.1	.0	.1	.1	.2	.3	.3	.1	.0	.1	.2
.3	.3	.3	.3	.4	.4	.5	.5	.5	.5	.4	.1	.0	.4	.3	.4	.4	.5	.5	.3	.5	.3	.2	.3	.3	.3	.3	.4	.4	.4	.4	.6	.4	.3	.3	.3
.4	.5	.4	.3	.3	.4	.4	.5	.5	.5	.5	.5	.2	.4	.4	.5	.4	.4	.5	.7	.5	.4	.4	.4	.5	.5	.6	.5	.5	.3	.5	.8	.6	.3	.4	.5
.5	.5	.5	.5	.4	.5	.5	.5	.5	.5	.6	.3	.1	.4	.5	.5	.5	.5	.5	.6	.6	.5	.5	.5	.5	.5	.6	.6	.5	.5	.5	.5	.6	.5	.5	.4
.6	.5	.6	.6	.6	.6	.6	.6	.6	.6	.5	.6	.6	.6	.6	.6	.6	.6	.6	.7	.6	.6	.6	.6	.6	.6	.7	.7	.6	.6	.6	.5	.6	.6	.5	.4
.6	.6	.6	.6	.6	.5	.6	.5	.6	.6	.5	.5	.6	.6	.6	.6	.5	.6	.6	.7	.7	.7	.7	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.5
.5	.6	.6	.6	.6	.6	.5	.5	.5	.5	.5	.6	.4	.5	.5	.5	.5	.4	.5	.5	.5	.4	.4	.4	.5	.4	.5	.5	.6	.6	.6	.6	.3	.3	.4	.5
-.1	.3	.2	.3	.2	.1	.2	.2	.5	.6	.4	.4	.0	.3	.2	.5	.1	-.7	-1.1	-1.0	-.9	-.4	-.1	-.1	-.3	-.4	.3	1.1	.4	.3	.1	-.1	.1	.0	.1	-.4
-.1	-.2	-.1	.3	.5	.3	.3	.7	.9	.4	.1	-.3	-.2	-.2	-.1	.0	-.1	-.4	-.6	-.7	-1.3	-1.4	-.7	.0	.4	.5	.0	-.4	-.7	-.9	-1.3	-1.3	-.8	.1	-.1	-.2

Figure 35. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2002
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

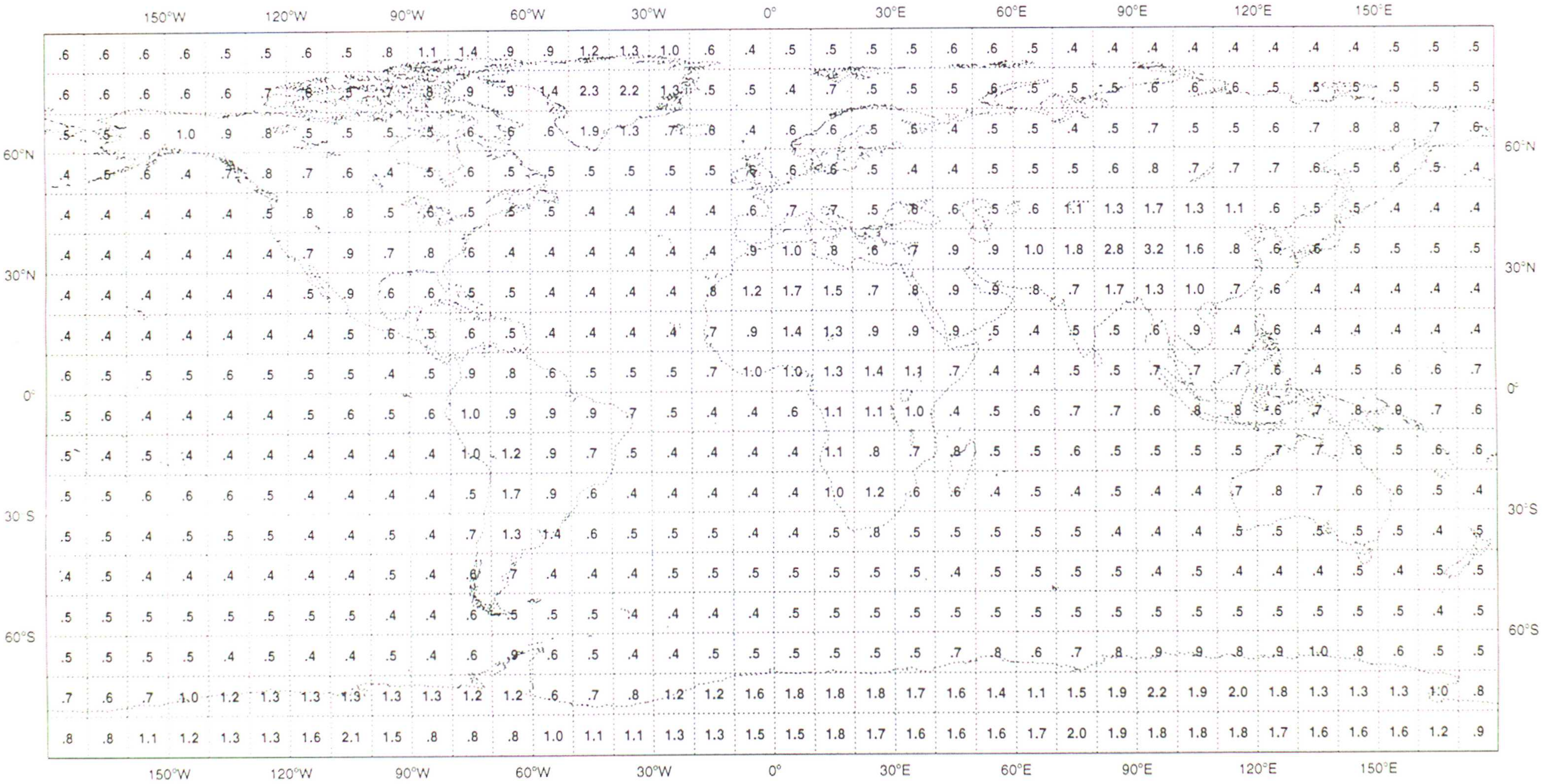

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.6 .6 .6 .6 .5 .5 .6 .5 .8 1.1 1.4 .9 .9 1.2 1.3 1.0 .6 .4 .5 .5 .5 .5 .6 .6 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5
.6 .6 .6 .6 .6 .7 .8 .5 .7 .8 .9 .9 1.4 2.3 2.2 1.3 .5 .5 .4 .7 .5 .5 .5 .6 .5 .5 .5 .6 .6 .6 .5 .5 .5 .5 .5 .5
.5 .5 .6 1.0 .9 .8 .5 .5 .5 .5 .6 .6 .6 1.9 1.3 .7 .8 .4 .6 .6 .5 .5 .4 .5 .5 .4 .5 .7 .5 .5 .6 .7 .8 .8 .7 .6
.4 .5 .6 .4 .7 .8 .7 .6 .4 .5 .6 .5 .5 .5 .5 .5 .5 .6 .6 .6 .5 .4 .4 .5 .5 .5 .6 .8 .7 .7 .7 .6 .5 .6 .5 .4
.4 .4 .4 .4 .4 .5 .8 .8 .5 .6 .5 .5 .5 .4 .4 .4 .4 .6 .7 .7 .5 .8 .6 .5 .6 1.1 1.3 1.7 1.3 1.1 .6 .5 .5 .4 .4 .4
.4 .4 .4 .4 .4 .4 .7 .9 .7 .8 .6 .4 .4 .4 .4 .4 .4 .9 1.0 .8 .6 .7 .9 .9 1.0 1.8 2.8 3.2 1.6 .8 .6 .6 .5 .5 .5 .5
.4 .4 .4 .4 .4 .4 .5 .9 .6 .6 .5 .5 .4 .4 .4 .4 .8 1.2 1.7 1.5 .7 .8 .9 .9 .8 .7 1.7 1.3 1.0 .7 .6 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .5 .6 .5 .6 .5 .4 .4 .4 .4 .7 .9 1.4 1.3 .9 .9 .9 .5 .4 .5 .5 .6 .9 .4 .6 .4 .4 .4 .4 .4
.6 .5 .5 .5 .6 .5 .5 .5 .4 .5 .9 .8 .6 .5 .5 .5 .7 1.0 1.0 1.3 1.4 1.1 .7 .4 .4 .5 .5 .7 .7 .7 .6 .4 .5 .6 .6 .7
.5 .6 .4 .4 .4 .4 .5 .6 .5 .6 1.0 .9 .9 .9 .7 .5 .4 .4 .6 1.1 1.1 1.0 .4 .5 .6 .7 .7 .6 .8 .8 .6 .7 .8 .9 .7 .6
.5 .4 .5 .4 .4 .4 .4 .4 .4 .4 1.0 1.2 .9 .7 .5 .4 .4 .4 .4 1.1 .8 .7 .8 .5 .5 .6 .5 .5 .5 .5 .7 .7 .6 .5 .6 .6
.5 .5 .6 .6 .6 .5 .4 .4 .4 .4 .5 1.7 .9 .6 .4 .4 .4 .4 .4 1.0 1.2 .6 .6 .4 .5 .4 .5 .4 .4 .7 .8 .7 .6 .6 .5 .4
.5 .5 .4 .5 .5 .5 .4 .4 .5 .4 .7 1.3 1.4 .6 .5 .5 .5 .4 .4 .5 .8 .5 .5 .5 .5 .5 .4 .4 .4 .5 .5 .5 .5 .5 .4 .5
.4 .5 .4 .4 .4 .4 .4 .4 .5 .4 .6 .7 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .4 .5 .4 .4 .4 .5 .4 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .6 .5 .5 .5 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5
.5 .5 .5 .5 .4 .5 .4 .4 .5 .4 .6 .9 .6 .5 .4 .4 .5 .5 .5 .5 .5 .5 .7 .8 .6 .7 .8 .9 .9 .8 .9 1.0 .8 .6 .5 .5
.7 .6 .7 1.0 1.2 1.3 1.3 1.3 1.3 1.3 1.2 1.2 .6 .7 .8 1.2 1.2 1.6 1.8 1.8 1.8 1.7 1.6 1.4 1.1 1.5 1.9 2.2 1.9 2.0 1.8 1.3 1.3 1.3 1.0 .8
.8 .8 1.1 1.2 1.3 1.3 1.6 2.1 1.5 .8 .8 .8 1.0 1.1 1.1 1.3 1.3 1.5 1.5 1.8 1.7 1.6 1.6 1.6 1.7 2.0 1.9 1.8 1.8 1.8 1.7 1.6 1.6 1.6 1.2 .9

Figure 36. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2002
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

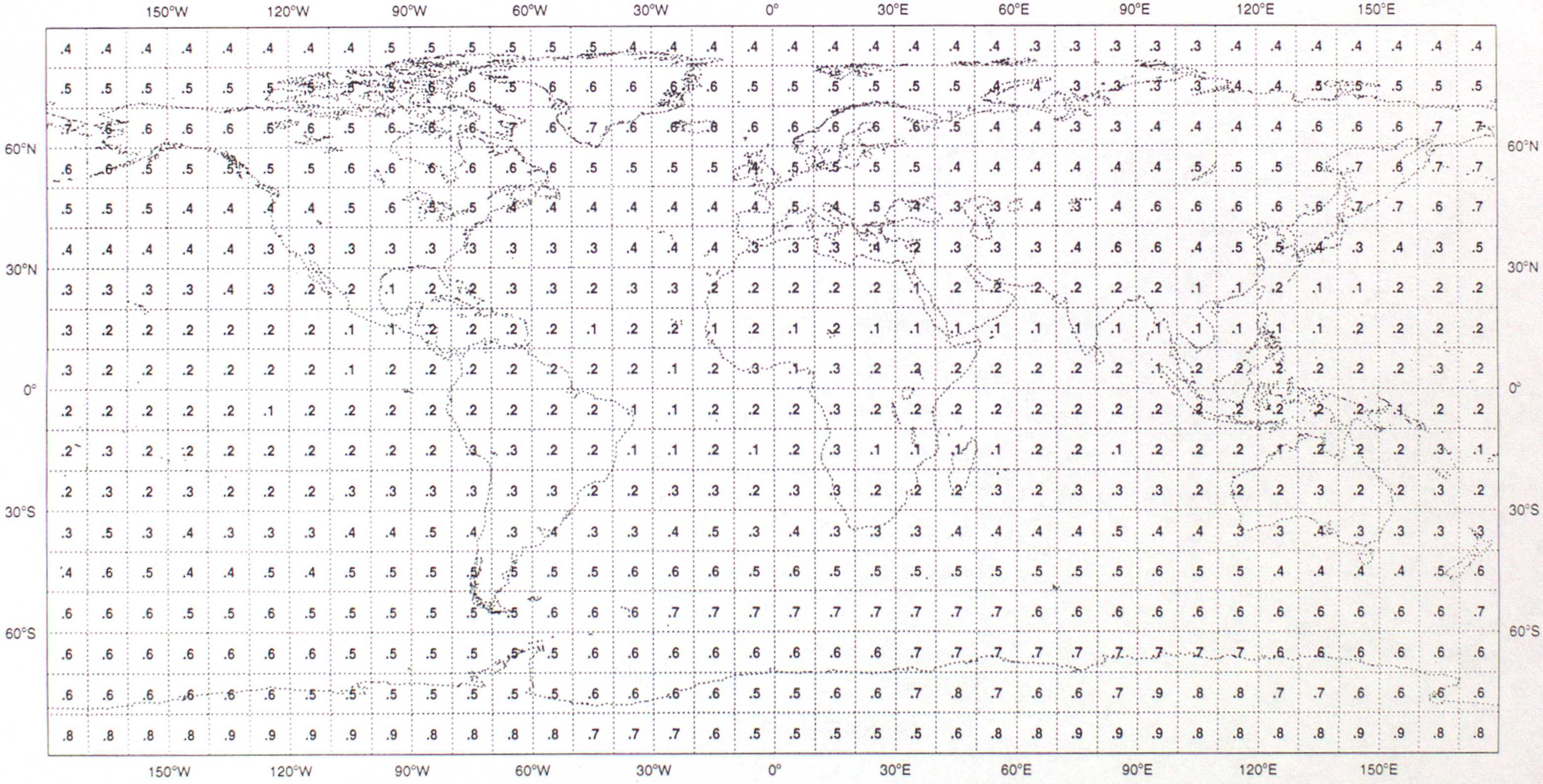

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4
.5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .6 .5 .6 .6 .6 .6 .6 .5 .5 .5 .5 .5 .5 .4 .4 .3 .3 .3 .3 .4 .4 .5 .5 .5 .5 .5
.7 .6 .6 .6 .6 .6 .6 .5 .6 .6 .6 .7 .6 .7 .6 .6 .8 .6 .6 .6 .6 .6 .5 .4 .4 .3 .3 .4 .4 .4 .4 .6 .6 .6 .7 .7
.6 .6 .5 .5 .5 .5 .5 .6 .6 .6 .6 .6 .6 .5 .5 .5 .5 .4 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .5 .5 .5 .6 .7 .6 .7 .7
.5 .5 .5 .4 .4 .4 .4 .5 .6 .5 .5 .4 .4 .4 .4 .4 .4 .4 .5 .4 .5 .4 .3 .3 .4 .3 .4 .6 .6 .6 .6 .6 .7 .7 .6 .7
.4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .3 .3 .3 .4 .2 .3 .3 .3 .4 .6 .6 .4 .5 .5 .4 .3 .4 .3 .5
.3 .3 .3 .3 .4 .3 .2 .2 .1 .2 .2 .3 .3 .2 .3 .3 .2 .2 .2 .2 .2 .1 .2 .2 .2 .2 .2 .2 .1 .1 .2 .1 .1 .2 .2 .2
.3 .2 .2 .2 .2 .2 .2 .1 .1 .2 .2 .2 .2 .1 .2 .2 .1 .2 .1 .2 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .2 .2 .2 .2
.3 .2 .2 .2 .2 .2 .2 .1 .2 .2 .2 .2 .2 .2 .2 .1 .2 .3 .1 .3 .2 .2 .2 .2 .2 .2 .2 .1 .2 .2 .2 .2 .2 .2 .3 .2
.2 .2 .2 .2 .2 .1 .2 .2 .2 .2 .2 .2 .2 .2 .1 .1 .2 .2 .2 .3 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .1 .2 .2
.2 .3 .2 .2 .2 .2 .2 .2 .2 .2 .3 .3 .2 .2 .1 .1 .2 .1 .2 .3 .1 .1 .1 .1 .2 .2 .1 .2 .2 .2 .1 .2 .2 .2 .3 .1
.2 .3 .2 .3 .2 .2 .2 .3 .3 .3 .3 .3 .3 .2 .2 .3 .3 .2 .3 .3 .2 .2 .2 .3 .2 .3 .3 .3 .2 .2 .2 .3 .2 .2 .3 .2
.3 .5 .3 .4 .3 .3 .3 .4 .4 .5 .4 .3 .4 .3 .3 .4 .5 .3 .4 .3 .3 .3 .4 .4 .4 .4 .5 .4 .4 .3 .3 .4 .3 .3 .3 .3
.4 .6 .5 .4 .4 .5 .4 .5 .5 .5 .5 .5 .5 .5 .6 .6 .6 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .4 .4 .4 .4 .5 .6
.6 .6 .6 .5 .5 .6 .5 .5 .5 .5 .5 .5 .6 .6 .6 .7 .7 .7 .7 .7 .7 .7 .7 .7 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .7
.6 .6 .6 .6 .6 .6 .6 .5 .5 .5 .5 .5 .5 .6 .6 .6 .6 .6 .6 .6 .6 .7 .7 .7 .7 .7 .7 .7 .7 .7 .6 .6 .6 .6 .6 .6
.6 .6 .6 .6 .6 .6 .5 .5 .5 .5 .5 .5 .5 .6 .6 .6 .6 .5 .5 .6 .6 .7 .8 .7 .6 .6 .7 .9 .8 .8 .7 .7 .6 .6 .6 .6
.8 .8 .8 .8 .9 .9 .9 .9 .9 .8 .8 .8 .8 .7 .7 .7 .6 .5 .5 .5 .5 .5 .6 .8 .8 .9 .9 .9 .8 .8 .8 .8 .9 .9 .8 .8
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S

Figure 37. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2002
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

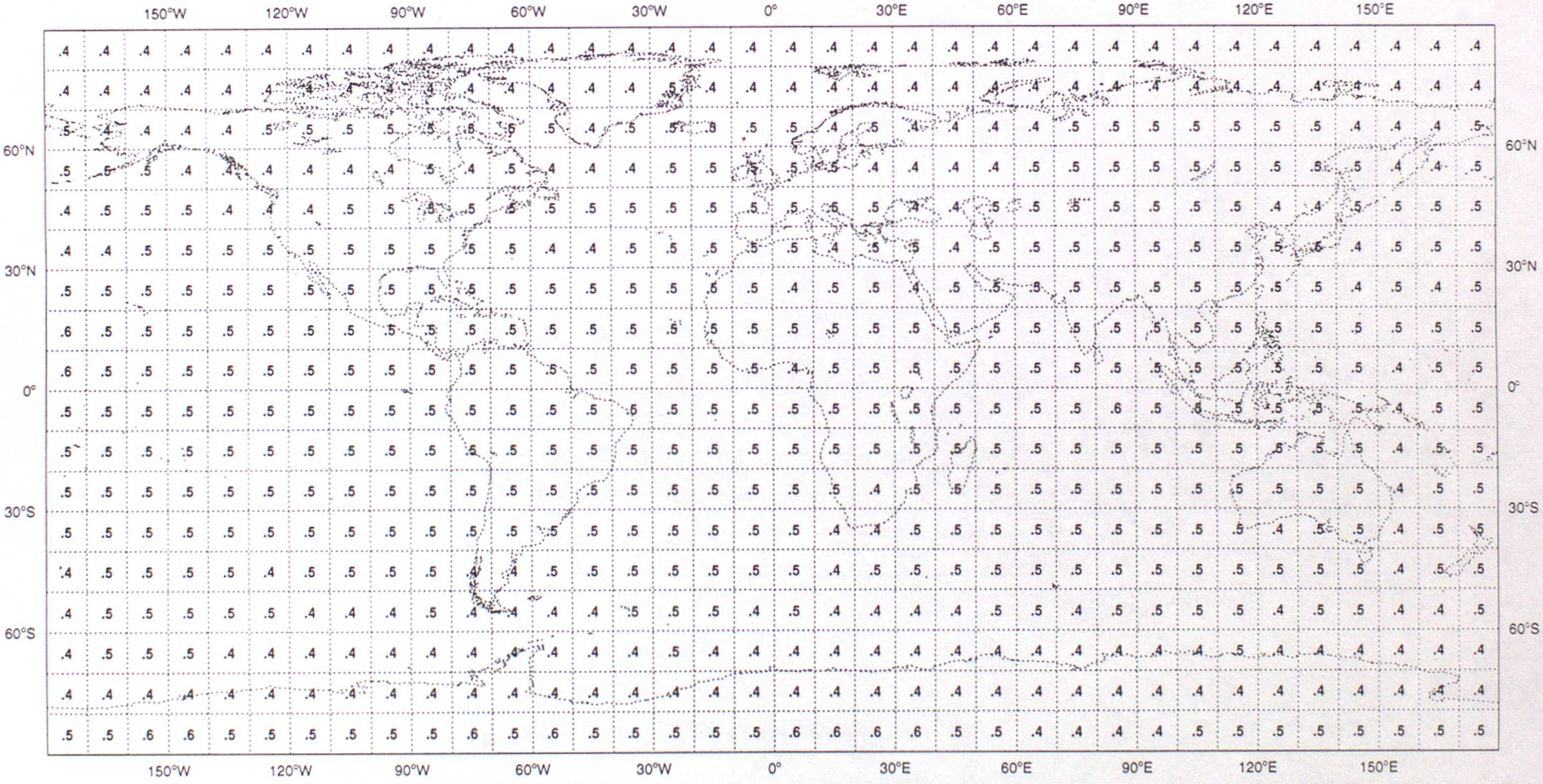

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 38. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2002
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

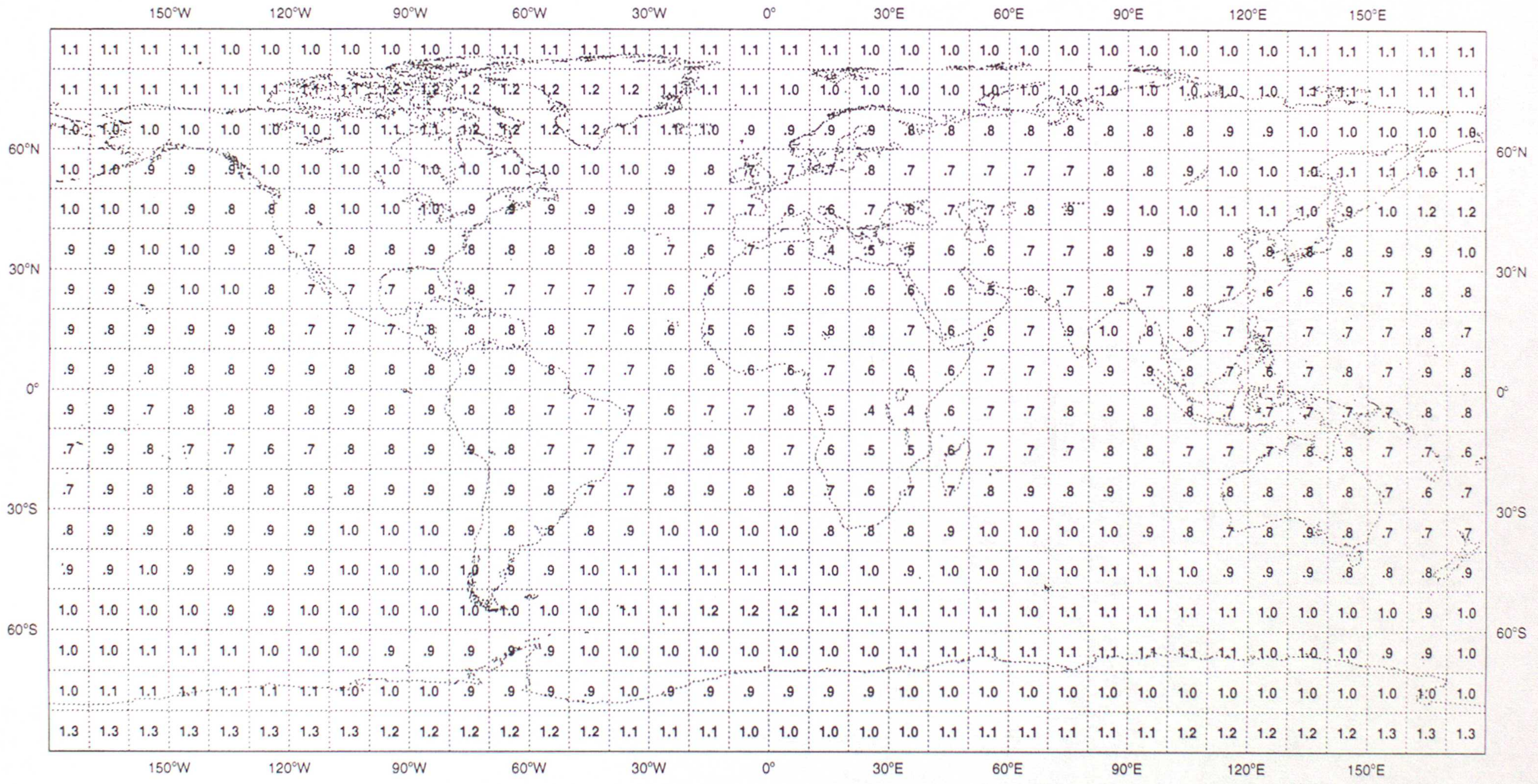
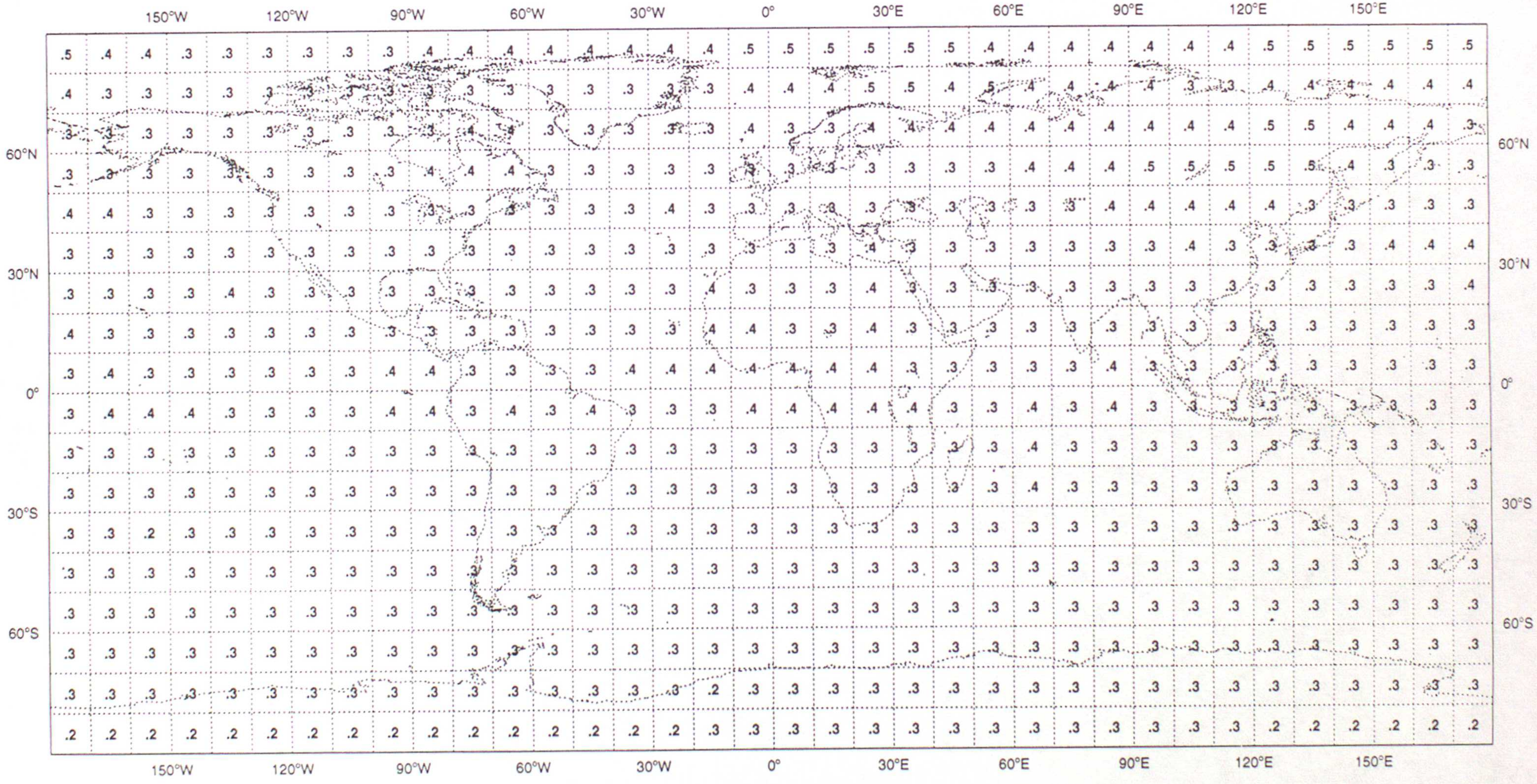

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
1.1 1.1 1.1 1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.1 1.1 1.1
1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.1 1.1 1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.1 1.1 1.1
1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.2 1.2 1.2 1.2 1.1 1.1 1.0 .9 .9 .9 .9 .8 .8 .8 .8 .8 .8 .8 .8 .9 .9 1.0 1.0 1.0 1.0 1.0
1.0 1.0 .9 .9 .9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 .9 .8 .7 .7 .7 .8 .7 .7 .7 .7 .7 .8 .8 .9 1.0 1.0 1.0 1.1 1.1 1.0 1.1
1.0 1.0 1.0 .9 .8 .8 .8 1.0 1.0 1.0 .9 .9 .9 .9 .9 .8 .7 .7 .6 .6 .7 .8 .7 .7 .8 .9 .9 1.0 1.0 1.1 1.1 1.0 .9 1.0 1.2 1.2
.9 .9 1.0 1.0 .9 .8 .7 .8 .8 .9 .8 .8 .8 .8 .8 .7 .6 .7 .6 .4 .5 .5 .6 .6 .7 .7 .8 .9 .8 .8 .8 .8 .8 .9 .9 1.0
.9 .9 .9 1.0 1.0 .8 .7 .7 .7 .8 .8 .7 .7 .7 .7 .6 .6 .6 .5 .6 .6 .6 .6 .5 .6 .7 .8 .7 .8 .7 .6 .6 .6 .7 .8 .8
.9 .8 .9 .9 .9 .8 .7 .7 .7 .8 .8 .8 .8 .7 .6 .6 .5 .6 .5 .8 .8 .7 .6 .6 .7 .9 1.0 .8 .8 .7 .7 .7 .7 .7 .8 .7
.9 .9 .8 .8 .8 .9 .9 .8 .8 .8 .9 .9 .8 .7 .7 .6 .6 .6 .6 .7 .6 .6 .6 .7 .7 .9 .9 .9 .8 .7 .6 .7 .8 .7 .9 .8
.9 .9 .7 .8 .8 .8 .8 .9 .8 .9 .8 .8 .7 .7 .7 .6 .7 .7 .8 .5 .4 .4 .6 .7 .7 .8 .9 .8 .8 .7 .7 .7 .7 .7 .8 .8
.7 .9 .8 .7 .7 .6 .7 .8 .8 .9 .9 .8 .7 .7 .7 .7 .8 .8 .7 .6 .5 .5 .6 .7 .7 .7 .8 .8 .7 .7 .7 .8 .8 .7 .7 .6
.7 .9 .8 .8 .8 .8 .8 .8 .9 .9 .9 .9 .8 .7 .7 .8 .9 .8 .8 .7 .6 .7 .7 .8 .9 .8 .9 .9 .8 .8 .8 .8 .8 .7 .6 .7
.8 .9 .9 .8 .9 .9 .9 1.0 1.0 1.0 .9 .8 .8 .8 .9 1.0 1.0 1.0 1.0 .8 .8 .8 .9 1.0 1.0 1.0 1.0 .9 .8 .7 .8 .9 .8 .7 .7 .7
.9 .9 1.0 .9 .9 .9 .9 1.0 1.0 1.0 1.0 .9 .9 1.0 1.1 1.1 1.1 1.1 1.1 1.0 1.0 .9 1.0 1.0 1.0 1.0 1.1 1.1 1.0 .9 .9 .9 .8 .8 .8 .9
1.0 1.0 1.0 1.0 .9 .9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.2 1.2 1.2 1.1 1.1 1.1 1.1 1.1 1.0 1.1 1.1 1.1 1.1 1.1 1.0 1.0 1.0 1.0 .9 1.0
1.0 1.0 1.1 1.1 1.1 1.0 1.0 1.0 .9 .9 .9 .9 .9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.0 1.0 1.0 .9 .9 1.0
1.0 1.1 1.1 1.1 1.1 1.1 1.1 1.0 1.0 1.0 .9 .9 .9 .9 1.0 .9 .9 .9 .9 .9 .9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.2 1.2 1.2 1.2 1.2 1.2 1.1 1.1 1.1 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.1 1.1 1.1 1.1 1.2 1.2 1.2 1.2 1.2 1.3 1.3 1.3

Figure 39. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2002

Channel: AMSUA-9 (100 hPa)

NOAA15, using all observations


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

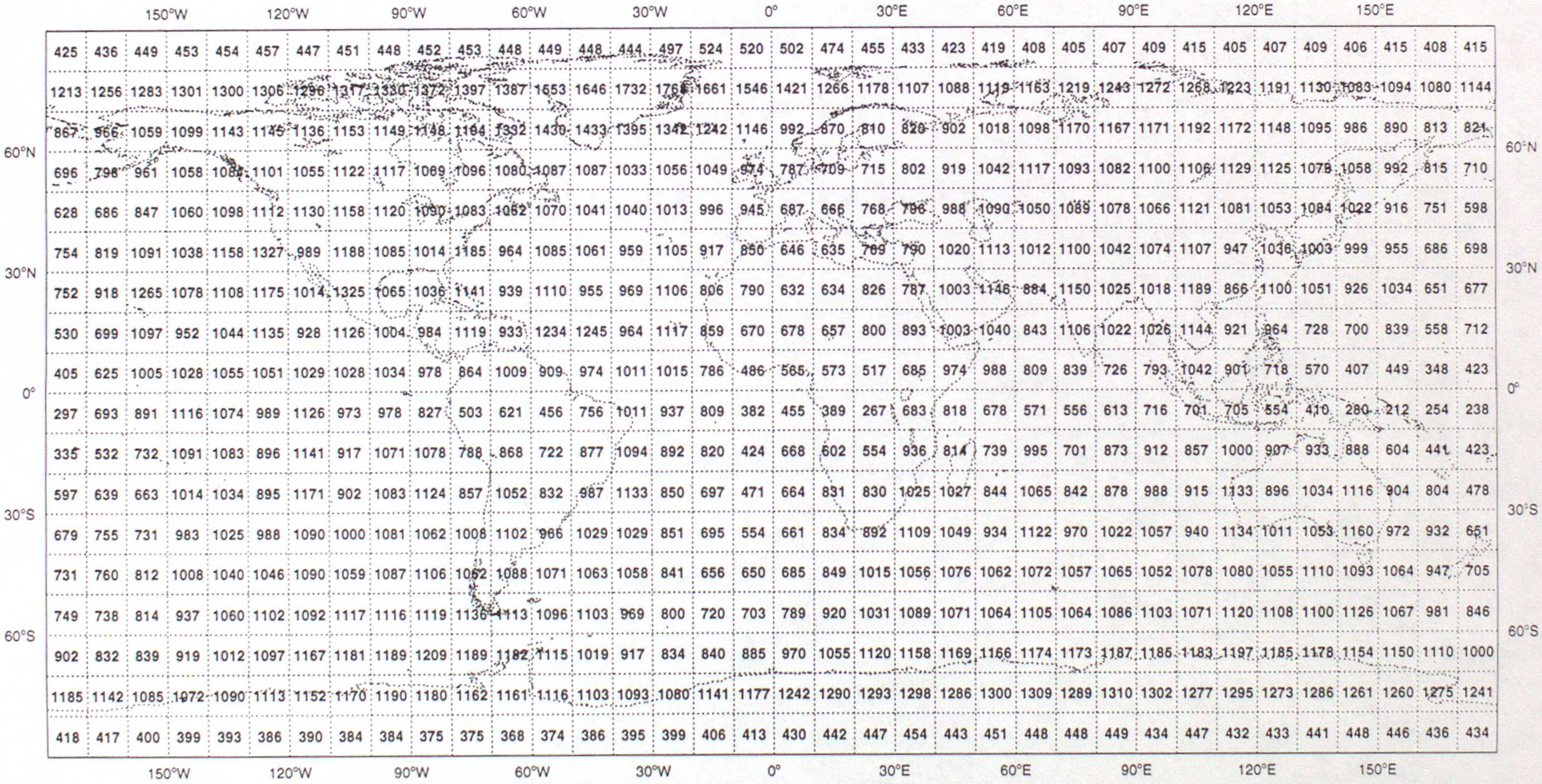
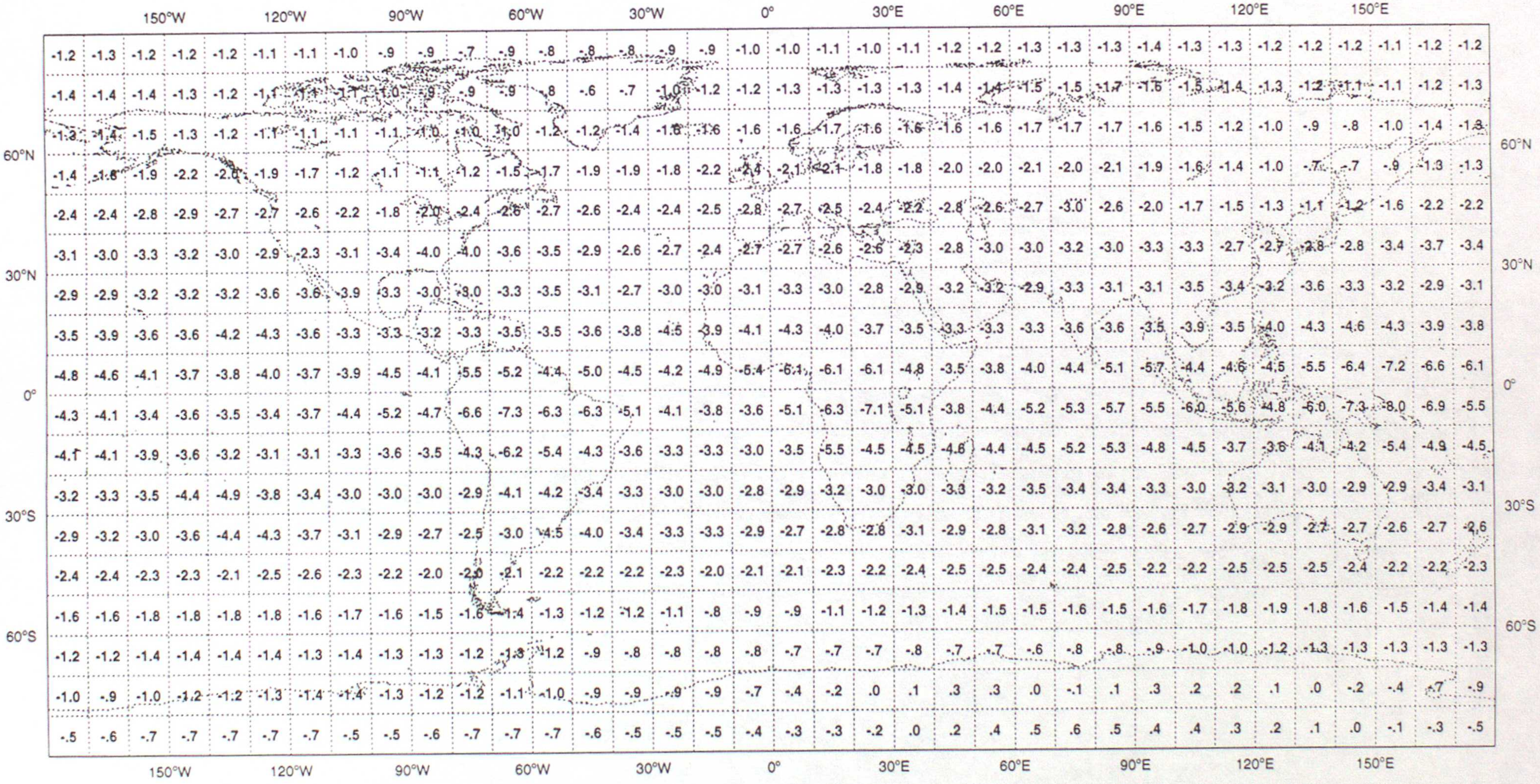


Figure 40. ATOVS mean daily count. MARCH 2002
NOAA16, using all observations
Global average number of observations in 24 hours = 593681

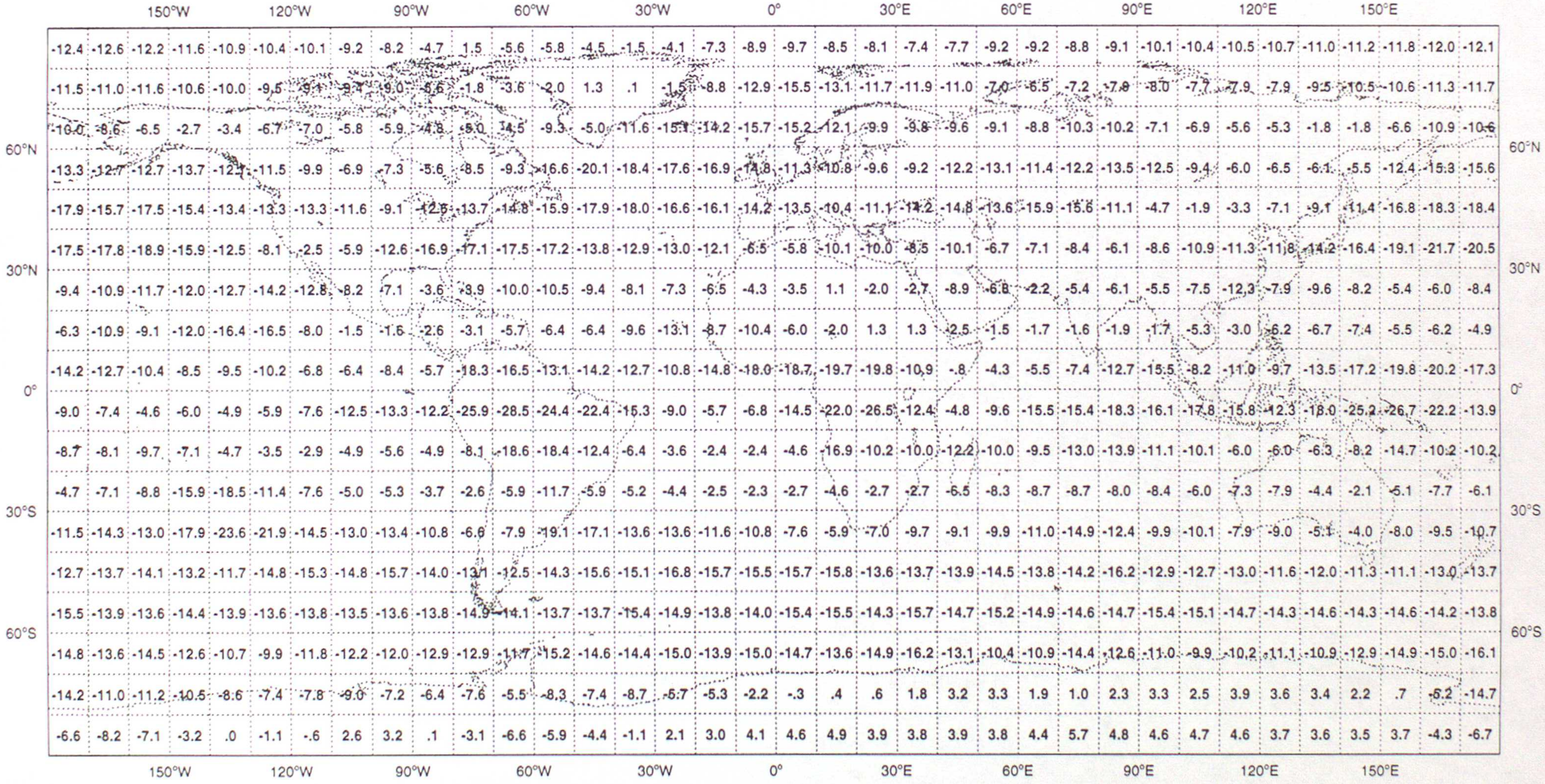
425	436	449	453	454	457	447	451	448	452	453	448	449	448	444	497	524	520	502	474	455	433	423	419	408	405	407	409	415	405	407	409	406	415	408	415
1213	1256	1283	1301	1300	1306	1296	1317	1330	1372	1397	1387	1653	1646	1732	1768	1661	1546	1421	1266	1178	1107	1088	1119	1163	1219	1243	1272	1268	1223	1191	1130	1083	1094	1080	1144
867	966	1059	1099	1143	1145	1136	1153	1149	1148	1194	1332	1430	1433	1395	1342	1242	1146	992	870	810	820	902	1018	1098	1170	1167	1171	1192	1172	1148	1095	986	890	813	821
696	798	961	1058	1084	1101	1055	1122	1117	1069	1096	1080	1087	1087	1033	1056	1049	974	787	709	715	802	919	1042	1117	1093	1082	1100	1106	1129	1125	1078	1058	992	815	710
628	686	847	1060	1098	1112	1130	1158	1120	1090	1083	1062	1070	1041	1040	1013	996	945	687	666	768	796	988	1090	1050	1089	1078	1066	1121	1081	1053	1084	1022	916	751	598
754	819	1091	1038	1158	1327	989	1188	1085	1014	1185	964	1085	1061	959	1105	917	850	646	635	769	790	1020	1113	1012	1100	1042	1074	1107	947	1036	1003	999	955	686	698
752	918	1265	1078	1108	1175	1014	1325	1065	1036	1141	939	1110	955	969	1106	806	790	632	634	826	787	1003	1146	884	1150	1025	1018	1189	866	1100	1051	926	1034	651	677
530	699	1097	952	1044	1135	928	1126	1004	984	1119	933	1234	1245	964	1117	859	670	678	657	800	893	1003	1040	843	1106	1022	1026	1144	921	964	728	700	839	558	712
405	625	1005	1028	1055	1051	1029	1028	1034	978	864	1009	909	974	1011	1015	786	486	565	573	517	685	974	988	809	839	726	793	1042	901	718	570	407	449	348	423
297	693	891	1116	1074	989	1126	973	978	827	503	621	456	756	1011	937	809	382	455	389	267	683	818	678	571	556	613	716	701	705	554	410	280	212	254	238
335	532	732	1091	1083	896	1141	917	1071	1078	788	868	722	877	1094	892	820	424	668	602	554	936	814	739	995	701	873	912	857	1000	907	933	888	604	441	423
597	639	663	1014	1034	895	1171	902	1083	1124	857	1052	832	987	1133	850	697	471	664	831	830	1025	1027	844	1065	842	878	988	915	1133	896	1034	1116	904	804	478
679	755	731	983	1025	988	1090	1000	1081	1062	1008	1102	966	1029	1029	851	695	554	661	834	892	1109	1049	934	1122	970	1022	1057	940	1134	1011	1053	1160	972	932	651
731	760	812	1008	1040	1046	1090	1059	1087	1106	1062	1088	1071	1063	1058	841	656	650	685	849	1015	1056	1076	1062	1072	1057	1065	1052	1078	1080	1055	1110	1093	1064	947	705
749	738	814	937	1060	1102	1092	1117	1116	1119	1136	1113	1096	1103	969	800	720	703	789	920	1031	1089	1071	1064	1105	1064	1086	1103	1071	1120	1108	1100	1126	1067	981	846
902	832	839	919	1012	1097	1167	1181	1189	1209	1189	1182	1115	1019	917	834	840	885	970	1055	1120	1158	1169	1166	1174	1173	1187	1185	1183	1197	1185	1178	1154	1150	1110	1000
1185	1142	1085	1072	1090	1113	1152	1170	1190	1180	1162	1161	1116	1103	1093	1080	1141	1177	1242	1290	1293	1298	1286	1300	1309	1289	1310	1302	1277	1295	1273	1286	1261	1260	1275	1241
418	417	400	399	393	386	390	384	384	375	375	368	374	386	395	399	406	413	430	442	447	454	443	451	448	448	449	434	447	432	433	441	448	446	436	434

Figure 41. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2002
Channel: HIRS8 (Surface)
NOAA16, using all observations



-1.2	-1.3	-1.2	-1.2	-1.2	-1.1	-1.1	-1.0	-.9	-.9	-.7	-.9	-.8	-.8	-.8	-.9	-.9	-1.0	-1.0	-1.1	-1.0	-1.1	-1.2	-1.2	-1.3	-1.3	-1.3	-1.4	-1.3	-1.3	-1.2	-1.2	-1.2	-1.1	-1.2	-1.2
-1.4	-1.4	-1.4	-1.3	-1.2	-1.1	-1.1	-1.1	-1.0	-.9	-.9	-.9	-.8	-.6	-.7	-1.0	-1.2	-1.2	-1.3	-1.3	-1.3	-1.3	-1.4	-1.4	-1.5	-1.5	-1.7	-1.6	-1.5	-1.4	-1.3	-1.2	-1.1	-1.1	-1.2	-1.3
-1.3	-1.4	-1.5	-1.3	-1.2	-1.1	-1.1	-1.1	-1.1	-1.0	-1.0	-1.0	-1.2	-1.2	-1.4	-1.6	-1.6	-1.6	-1.6	-1.7	-1.6	-1.6	-1.6	-1.6	-1.7	-1.7	-1.7	-1.6	-1.5	-1.2	-1.0	-.9	-.8	-1.0	-1.4	-1.3
-1.4	-1.6	-1.9	-2.2	-2.0	-1.9	-1.7	-1.2	-1.1	-1.1	-1.2	-1.5	-1.7	-1.9	-1.9	-1.8	-2.2	-2.4	-2.1	-2.1	-1.8	-1.8	-2.0	-2.0	-2.1	-2.0	-2.1	-1.9	-1.6	-1.4	-1.0	-.7	-.7	-.9	-1.3	-1.3
-2.4	-2.4	-2.8	-2.9	-2.7	-2.7	-2.6	-2.2	-1.8	-2.0	-2.4	-2.6	-2.7	-2.6	-2.4	-2.4	-2.5	-2.8	-2.7	-2.5	-2.4	-2.2	-2.8	-2.6	-2.7	-3.0	-2.6	-2.0	-1.7	-1.5	-1.3	-1.1	-1.2	-1.6	-2.2	-2.2
-3.1	-3.0	-3.3	-3.2	-3.0	-2.9	-2.3	-3.1	-3.4	-4.0	-4.0	-3.6	-3.5	-2.9	-2.6	-2.7	-2.4	-2.7	-2.7	-2.6	-2.6	-2.3	-2.8	-3.0	-3.0	-3.2	-3.0	-3.3	-3.3	-2.7	-2.7	-2.8	-2.8	-3.4	-3.7	-3.4
-2.9	-2.9	-3.2	-3.2	-3.2	-3.6	-3.6	-3.9	-3.3	-3.0	-3.0	-3.3	-3.5	-3.1	-2.7	-3.0	-3.0	-3.1	-3.3	-3.0	-2.8	-2.9	-3.2	-3.2	-2.9	-3.3	-3.1	-3.1	-3.5	-3.4	-3.2	-3.6	-3.3	-3.2	-2.9	-3.1
-3.5	-3.9	-3.6	-3.6	-4.2	-4.3	-3.6	-3.3	-3.3	-3.2	-3.3	-3.5	-3.5	-3.6	-3.8	-4.5	-3.9	-4.1	-4.3	-4.0	-3.7	-3.5	-3.3	-3.3	-3.3	-3.6	-3.6	-3.5	-3.9	-3.5	-4.0	-4.3	-4.6	-4.3	-3.9	-3.8
-4.8	-4.6	-4.1	-3.7	-3.8	-4.0	-3.7	-3.9	-4.5	-4.1	-5.5	-5.2	-4.4	-5.0	-4.5	-4.2	-4.9	-5.4	-6.1	-6.1	-6.1	-4.8	-3.5	-3.8	-4.0	-4.4	-5.1	-5.7	-4.4	-4.6	-4.5	-5.5	-6.4	-7.2	-6.6	-6.1
-4.3	-4.1	-3.4	-3.6	-3.5	-3.4	-3.7	-4.4	-5.2	-4.7	-6.6	-7.3	-6.3	-6.3	-5.1	-4.1	-3.8	-3.6	-5.1	-6.3	-7.1	-5.1	-3.8	-4.4	-5.2	-5.3	-5.7	-5.5	-6.0	-5.6	-4.8	-6.0	-7.3	-8.0	-6.9	-5.5
-4.1	-4.1	-3.9	-3.6	-3.2	-3.1	-3.1	-3.3	-3.6	-3.5	-4.3	-6.2	-5.4	-4.3	-3.6	-3.3	-3.3	-3.0	-3.5	-5.5	-4.5	-4.5	-4.6	-4.4	-4.5	-5.2	-5.3	-4.8	-4.5	-3.7	-3.6	-4.1	-4.2	-5.4	-4.9	-4.5
-3.2	-3.3	-3.5	-4.4	-4.9	-3.8	-3.4	-3.0	-3.0	-3.0	-2.9	-4.1	-4.2	-3.4	-3.3	-3.0	-3.0	-2.8	-2.9	-3.2	-3.0	-3.0	-3.3	-3.2	-3.5	-3.4	-3.4	-3.3	-3.0	-3.2	-3.1	-3.0	-2.9	-2.9	-3.4	-3.1
-2.9	-3.2	-3.0	-3.6	-4.4	-4.3	-3.7	-3.1	-2.9	-2.7	-2.5	-3.0	-4.5	-4.0	-3.4	-3.3	-3.3	-2.9	-2.7	-2.8	-2.8	-3.1	-2.9	-2.8	-3.1	-3.2	-2.8	-2.6	-2.7	-2.9	-2.9	-2.7	-2.7	-2.6	-2.7	-2.6
-2.4	-2.4	-2.3	-2.3	-2.1	-2.5	-2.6	-2.3	-2.2	-2.0	-2.0	-2.1	-2.2	-2.2	-2.2	-2.3	-2.0	-2.1	-2.1	-2.3	-2.2	-2.4	-2.5	-2.5	-2.4	-2.4	-2.5	-2.2	-2.2	-2.5	-2.5	-2.5	-2.4	-2.2	-2.2	-2.3
-1.6	-1.6	-1.8	-1.8	-1.8	-1.8	-1.6	-1.7	-1.6	-1.5	-1.6	-1.4	-1.3	-1.2	-1.2	-1.1	-.8	-.9	-.9	-1.1	-1.2	-1.3	-1.4	-1.5	-1.5	-1.6	-1.5	-1.6	-1.7	-1.8	-1.9	-1.8	-1.6	-1.5	-1.4	-1.4
-1.2	-1.2	-1.4	-1.4	-1.4	-1.4	-1.3	-1.4	-1.3	-1.3	-1.2	-1.3	-1.2	-.9	-.8	-.8	-.8	-.8	-.7	-.7	-.7	-.8	-.7	-.7	-.6	-.8	-.8	-.9	-1.0	-1.0	-1.2	-1.3	-1.3	-1.3	-1.3	-1.3
-1.0	-.9	-1.0	-1.2	-1.2	-1.3	-1.4	-1.4	-1.3	-1.2	-1.2	-1.1	-1.0	-.9	-.9	-.9	-.9	-.7	-.4	-.2	.0	.1	.3	.3	.0	-.1	.1	.3	.2	.2	.1	.0	-.2	-.4	-.7	-.9
-.5	-.6	-.7	-.7	-.7	-.7	-.7	-.5	-.5	-.6	-.7	-.7	-.7	-.6	-.5	-.5	-.5	-.4	-.3	-.3	-.2	.0	.2	.4	.5	.6	.5	.4	.4	.3	.2	.1	.0	-.1	-.3	-.5

Figure 42. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2002
Channel: HIRS8 (Surface)
NOAA16, using all observations

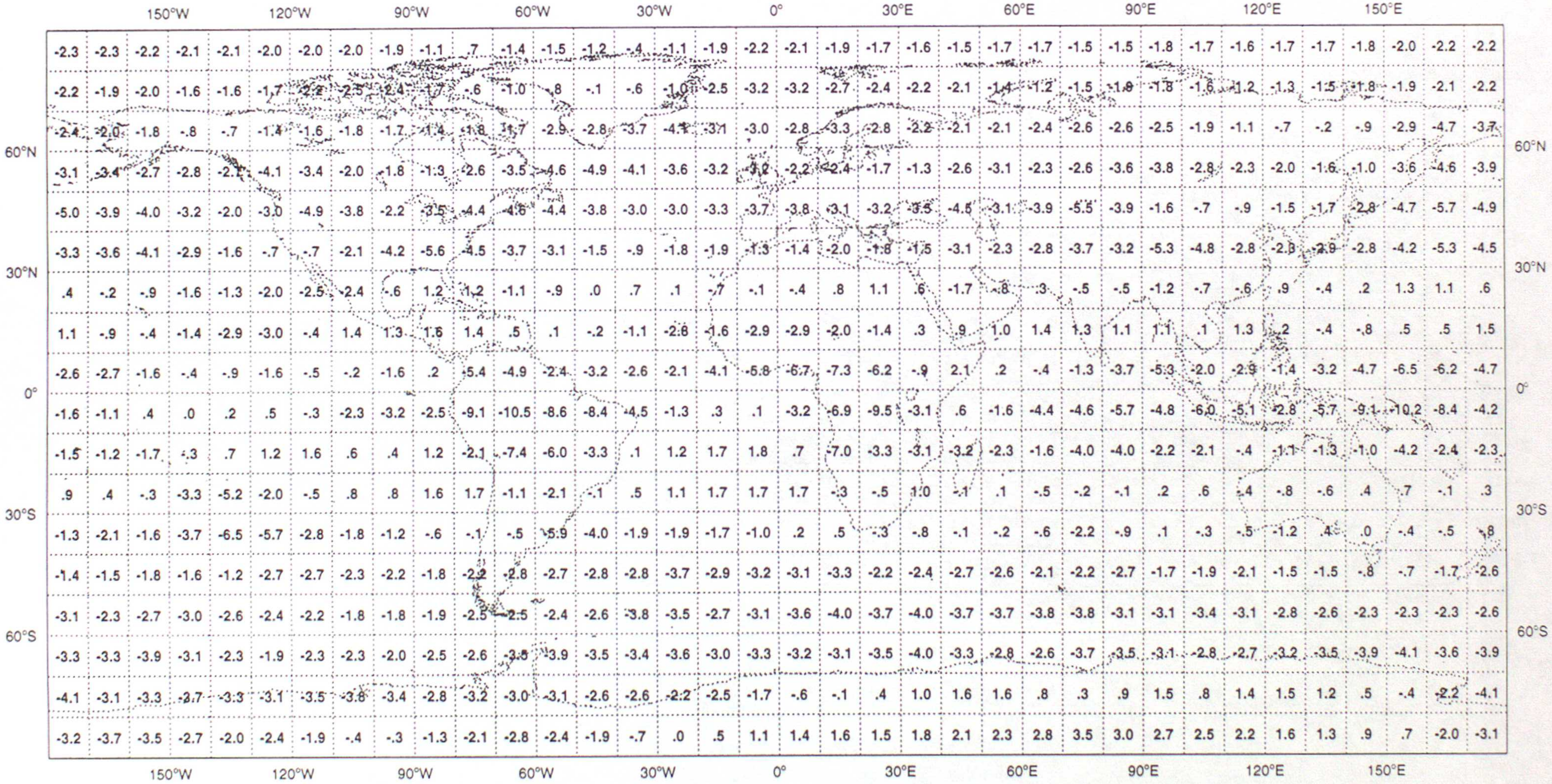


-12.4	-12.6	-12.2	-11.6	-10.9	-10.4	-10.1	-9.2	-8.2	-4.7	1.5	-5.6	-5.8	-4.5	-1.5	-4.1	-7.3	-8.9	-9.7	-8.5	-8.1	-7.4	-7.7	-9.2	-9.2	-8.8	-9.1	-10.1	-10.4	-10.5	-10.7	-11.0	-11.2	-11.8	-12.0	-12.1
-11.5	-11.0	-11.6	-10.6	-10.0	-9.5	-9.1	-9.4	-9.0	-5.6	-1.8	-3.6	-2.0	1.3	.1	-1.5	-8.8	-12.9	-15.5	-13.1	-11.7	-11.9	-11.0	-7.0	-6.5	-7.2	-7.8	-8.0	-7.7	-7.9	-7.9	-9.5	-10.5	-10.6	-11.3	-11.7
-10.0	-8.6	-6.5	-2.7	-3.4	-6.7	-7.0	-5.8	-5.9	-4.8	-5.0	-4.5	-9.3	-5.0	-11.6	-15.1	-14.2	-15.7	-15.2	-12.1	-9.9	-9.8	-9.6	-9.1	-8.8	-10.3	-10.2	-7.1	-6.9	-5.6	-5.3	-1.8	-1.8	-6.6	-10.9	-10.6
-13.3	-12.7	-12.7	-13.7	-12.1	-11.5	-9.9	-6.9	-7.3	-5.6	-8.5	-9.3	-16.6	-20.1	-18.4	-17.6	-16.9	-14.8	-11.3	-10.8	-9.6	-9.2	-12.2	-13.1	-11.4	-12.2	-13.5	-12.5	-9.4	-6.0	-6.5	-6.1	-5.5	-12.4	-15.3	-15.6
-17.9	-15.7	-17.5	-15.4	-13.4	-13.3	-13.3	-11.6	-9.1	-12.6	-13.7	-14.8	-15.9	-17.9	-18.0	-16.6	-16.1	-14.2	-13.5	-10.4	-11.1	-14.2	-14.8	-13.6	-15.9	-15.6	-11.1	-4.7	-1.9	-3.3	-7.1	-9.1	-11.4	-16.8	-18.3	-18.4
-17.5	-17.8	-18.9	-15.9	-12.5	-8.1	-2.5	-5.9	-12.6	-16.9	-17.1	-17.5	-17.2	-13.8	-12.9	-13.0	-12.1	-6.5	-5.8	-10.1	-10.0	-8.5	-10.1	-6.7	-7.1	-8.4	-6.1	-8.6	-10.9	-11.3	-11.8	-14.2	-16.4	-19.1	-21.7	-20.5
-9.4	-10.9	-11.7	-12.0	-12.7	-14.2	-12.8	-8.2	-7.1	-3.6	-3.9	-10.0	-10.5	-9.4	-8.1	-7.3	-6.5	-4.3	-3.5	1.1	-2.0	-2.7	-8.9	-6.8	-2.2	-5.4	-6.1	-5.5	-7.5	-12.3	-7.9	-9.6	-8.2	-5.4	-6.0	-8.4
-6.3	-10.9	-9.1	-12.0	-16.4	-16.5	-8.0	-1.5	-1.6	-2.6	-3.1	-5.7	-6.4	-6.4	-9.6	-13.1	-8.7	-10.4	-6.0	-2.0	1.3	1.3	-2.5	-1.5	-1.7	-1.6	-1.9	-1.7	-5.3	-3.0	-6.2	-6.7	-7.4	-5.5	-6.2	-4.9
-14.2	-12.7	-10.4	-8.5	-9.5	-10.2	-6.8	-6.4	-8.4	-5.7	-18.3	-16.5	-13.1	-14.2	-12.7	-10.8	-14.8	-18.0	-18.7	-19.7	-19.8	-10.9	-.8	-4.3	-5.5	-7.4	-12.7	-15.5	-8.2	-11.0	-9.7	-13.5	-17.2	-19.8	-20.2	-17.3
-9.0	-7.4	-4.6	-6.0	-4.9	-5.9	-7.6	-12.5	-13.3	-12.2	-25.9	-28.5	-24.4	-22.4	-15.3	-9.0	-5.7	-6.8	-14.5	-22.0	-26.5	-12.4	-4.8	-9.6	-15.5	-15.4	-18.3	-16.1	-17.8	-15.8	-12.3	-18.0	-25.2	-26.7	-22.2	-13.9
-8.7	-8.1	-9.7	-7.1	-4.7	-3.5	-2.9	-4.9	-5.6	-4.9	-8.1	-18.6	-18.4	-12.4	-6.4	-3.6	-2.4	-2.4	-4.6	-16.9	-10.2	-10.0	-12.2	-10.0	-9.5	-13.0	-13.9	-11.1	-10.1	-6.0	-6.0	-6.3	-8.2	-14.7	-10.2	-10.2
-4.7	-7.1	-8.8	-15.9	-18.5	-11.4	-7.6	-5.0	-5.3	-3.7	-2.6	-5.9	-11.7	-5.9	-5.2	-4.4	-2.5	-2.3	-2.7	-4.6	-2.7	-2.7	-6.5	-8.3	-8.7	-8.7	-8.0	-8.4	-6.0	-7.3	-7.9	-4.4	-2.1	-5.1	-7.7	-6.1
-11.5	-14.3	-13.0	-17.9	-23.6	-21.9	-14.5	-13.0	-13.4	-10.8	-6.6	-7.9	-19.1	-17.1	-13.6	-13.6	-11.6	-10.8	-7.6	-5.9	-7.0	-9.7	-9.1	-9.9	-11.0	-14.9	-12.4	-9.9	-10.1	-7.9	-9.0	-5.1	-4.0	-8.0	-9.5	-10.7
-12.7	-13.7	-14.1	-13.2	-11.7	-14.8	-15.3	-14.8	-15.7	-14.0	-13.1	-12.5	-14.3	-15.6	-15.1	-16.8	-15.7	-15.5	-15.7	-15.8	-13.6	-13.7	-13.9	-14.5	-13.8	-14.2	-16.2	-12.9	-12.7	-13.0	-11.6	-12.0	-11.3	-11.1	-13.0	-13.7
-15.5	-13.9	-13.6	-14.4	-13.9	-13.6	-13.8	-13.5	-13.6	-13.8	-14.9	-14.1	-13.7	-13.7	-15.4	-14.9	-13.8	-14.0	-15.4	-15.5	-14.3	-15.7	-14.7	-15.2	-14.9	-14.6	-14.7	-15.4	-15.1	-14.7	-14.3	-14.6	-14.3	-14.6	-14.2	-13.8
-14.8	-13.6	-14.5	-12.6	-10.7	-9.9	-11.8	-12.2	-12.0	-12.9	-12.9	-11.7	-15.2	-14.6	-14.4	-15.0	-13.9	-15.0	-14.7	-13.6	-14.9	-16.2	-13.1	-10.4	-10.9	-14.4	-12.6	-11.0	-9.9	-10.2	-11.1	-10.9	-12.9	-14.9	-15.0	-16.1
-14.2	-11.0	-11.2	-10.5	-8.6	-7.4	-7.8	-9.0	-7.2	-6.4	-7.6	-5.5	-8.3	-7.4	-8.7	-5.7	-5.3	-2.2	-.3	.4	.6	1.8	3.2	3.3	1.9	1.0	2.3	3.3	2.5	3.9	3.6	3.4	2.2	.7	-6.2	-14.7
-6.6	-8.2	-7.1	-3.2	.0	-1.1	-.6	2.6	3.2	.1	-3.1	-6.6	-5.9	-4.4	-1.1	2.1	3.0	4.1	4.6	4.9	3.9	3.8	3.9	3.8	4.4	5.7	4.8	4.6	4.7	4.6	3.7	3.6	3.5	3.7	-4.3	-6.7

Figure 43. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2002

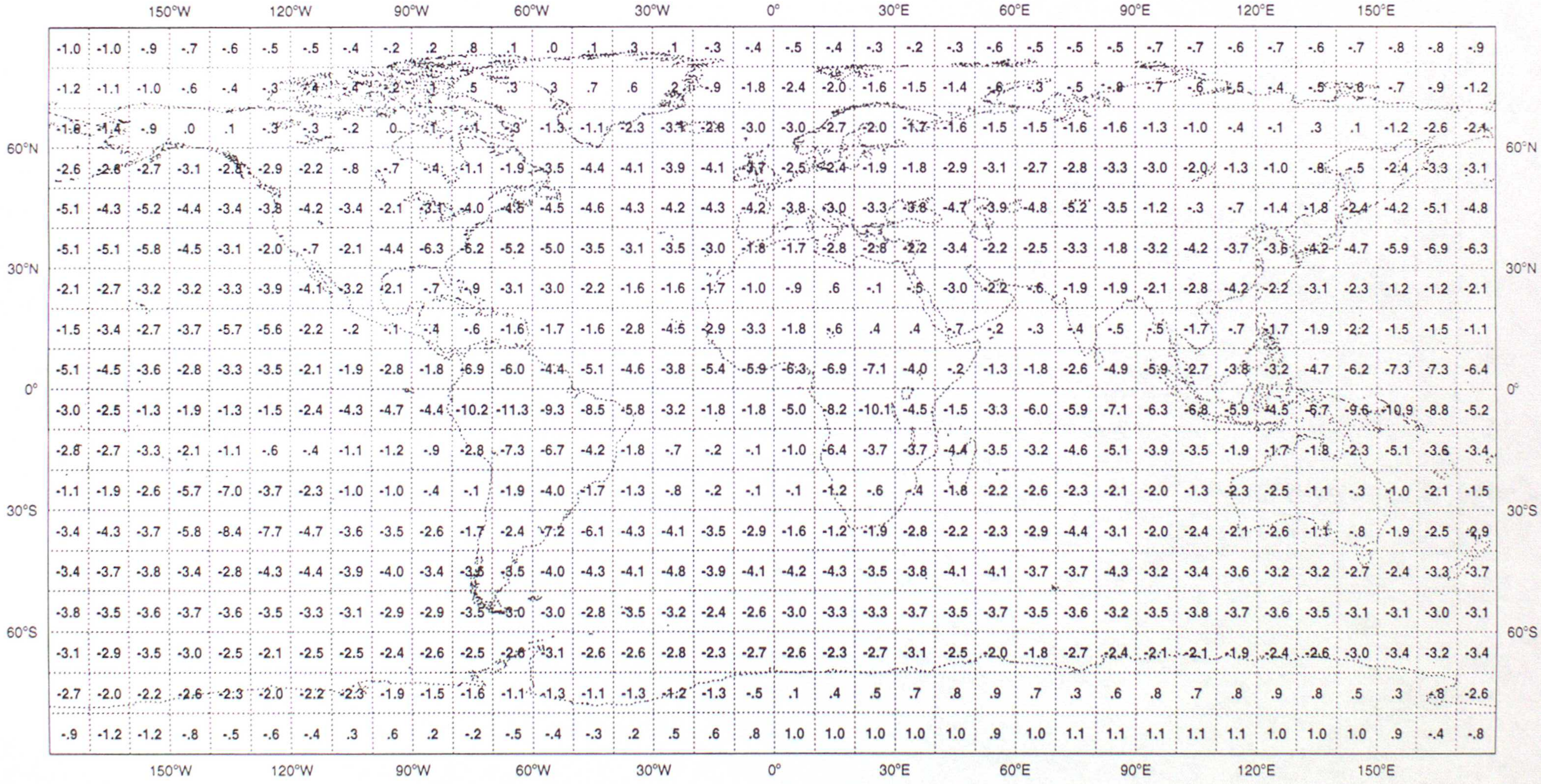
Channel: HIRS15 (700 hPa)

NOAA16, using all observations



-2.3	-2.3	-2.2	-2.1	-2.1	-2.0	-2.0	-2.0	-1.9	-1.1	.7	-1.4	-1.5	-1.2	-.4	-1.1	-1.9	-2.2	-2.1	-1.9	-1.7	-1.6	-1.5	-1.7	-1.7	-1.5	-1.5	-1.8	-1.7	-1.6	-1.7	-1.7	-1.8	-2.0	-2.2	-2.2
-2.2	-1.9	-2.0	-1.6	-1.6	-1.7	-2.2	-2.5	-2.4	-1.7	-.6	-1.0	-.8	-.1	-.6	-1.0	-2.5	-3.2	-3.2	-2.7	-2.4	-2.2	-2.1	-1.4	-1.2	-1.5	-1.8	-1.8	-1.6	-1.2	-1.3	-1.5	-1.8	-1.9	-2.1	-2.2
-2.4	-2.0	-1.8	-.8	-.7	-1.4	-1.6	-1.8	-1.7	-1.4	-1.8	-1.7	-2.9	-2.8	-3.7	-4.1	-3.1	-3.0	-2.8	-3.3	-2.8	-2.2	-2.1	-2.1	-2.4	-2.6	-2.6	-2.5	-1.9	-1.1	-.7	-.2	-.9	-2.9	-4.7	-3.7
-3.1	-3.4	-2.7	-2.8	-2.1	-4.1	-3.4	-2.0	-1.8	-1.3	-2.6	-3.5	-4.6	-4.9	-4.1	-3.6	-3.2	-3.2	-2.2	-2.4	-1.7	-1.3	-2.6	-3.1	-2.3	-2.6	-3.6	-3.8	-2.8	-2.3	-2.0	-1.6	-1.0	-3.6	-4.6	-3.9
-5.0	-3.9	-4.0	-3.2	-2.0	-3.0	-4.9	-3.8	-2.2	-3.5	-4.4	-4.6	-4.4	-3.8	-3.0	-3.0	-3.3	-3.7	-3.8	-3.1	-3.2	-3.5	-4.5	-3.1	-3.9	-5.5	-3.9	-1.6	-.7	-.9	-1.5	-1.7	-2.8	-4.7	-5.7	-4.9
-3.3	-3.6	-4.1	-2.9	-1.6	-.7	-.7	-2.1	-4.2	-5.6	-4.5	-3.7	-3.1	-1.5	-.9	-1.8	-1.9	-1.3	-1.4	-2.0	-1.8	-1.5	-3.1	-2.3	-2.8	-3.7	-3.2	-5.3	-4.8	-2.8	-2.8	-2.9	-2.8	-4.2	-5.3	-4.5
.4	-.2	-.9	-1.6	-1.3	-2.0	-2.5	-2.4	-.6	1.2	1.2	-1.1	-.9	.0	.7	.1	-.7	-.1	-.4	.8	1.1	.6	-1.7	-.8	.3	-.5	-.5	-1.2	-.7	-.6	.9	-.4	.2	1.3	1.1	.6
1.1	-.9	-.4	-1.4	-2.9	-3.0	-.4	1.4	1.3	1.6	1.4	.5	.1	-.2	-1.1	-2.8	-1.6	-2.9	-2.9	-2.0	-1.4	.3	.9	1.0	1.4	1.3	1.1	1.1	.1	1.3	.2	-.4	-.8	.5	.5	1.5
-2.6	-2.7	-1.6	-.4	-.9	-1.6	-.5	-.2	-1.6	.2	-5.4	-4.9	-2.4	-3.2	-2.6	-2.1	-4.1	-5.8	-6.7	-7.3	-6.2	-.9	2.1	.2	-.4	-1.3	-3.7	-5.3	-2.0	-2.9	-1.4	-3.2	-4.7	-6.5	-6.2	-4.7
-1.6	-1.1	.4	.0	.2	.5	-.3	-2.3	-3.2	-2.5	-9.1	-10.5	-8.6	-8.4	-4.5	-1.3	.3	.1	-3.2	-6.9	-9.5	-3.1	.6	-1.6	-4.4	-4.6	-5.7	-4.8	-6.0	-5.1	-2.8	-5.7	-9.1	-10.2	-8.4	-4.2
-1.5	-1.2	-1.7	-.3	.7	1.2	1.6	.6	.4	1.2	-2.1	-7.4	-6.0	-3.3	.1	1.2	1.7	1.8	.7	-7.0	-3.3	-3.1	-3.2	-2.3	-1.6	-4.0	-4.0	-2.2	-2.1	-.4	-1.1	-1.3	-1.0	-4.2	-2.4	-2.3
.9	.4	-.3	-3.3	-5.2	-2.0	-.5	.8	.8	1.6	1.7	-1.1	-2.1	-.1	.5	1.1	1.7	1.7	1.7	-.3	-.5	1.0	-.1	.1	-.5	-.2	-.1	.2	.6	-.4	-.8	-.6	.4	.7	-.1	.3
-1.3	-2.1	-1.6	-3.7	-6.5	-5.7	-2.8	-1.8	-1.2	-.6	-.1	-.5	-5.9	-4.0	-1.9	-1.9	-1.7	-1.0	.2	.5	-.3	-.8	-.1	-.2	-.6	-2.2	-.9	.1	-.3	-.5	-1.2	.4	.0	-.4	-.5	.8
-1.4	-1.5	-1.8	-1.6	-1.2	-2.7	-2.7	-2.3	-2.2	-1.8	-2.2	-2.8	-2.7	-2.8	-2.8	-3.7	-2.9	-3.2	-3.1	-3.3	-2.2	-2.4	-2.7	-2.6	-2.1	-2.2	-2.7	-1.7	-1.9	-2.1	-1.5	-1.5	-.8	-.7	-1.7	-2.6
-3.1	-2.3	-2.7	-3.0	-2.6	-2.4	-2.2	-1.8	-1.8	-1.9	-2.5	-2.5	-2.4	-2.6	-3.8	-3.5	-2.7	-3.1	-3.6	-4.0	-3.7	-4.0	-3.7	-3.7	-3.8	-3.8	-3.1	-3.1	-3.4	-3.1	-2.8	-2.6	-2.3	-2.3	-2.3	-2.6
-3.3	-3.3	-3.9	-3.1	-2.3	-1.9	-2.3	-2.3	-2.0	-2.5	-2.6	-3.5	-3.9	-3.5	-3.4	-3.6	-3.0	-3.3	-3.2	-3.1	-3.5	-4.0	-3.3	-2.8	-2.6	-3.7	-3.5	-3.1	-2.8	-2.7	-3.2	-3.5	-3.9	-4.1	-3.6	-3.9
-4.1	-3.1	-3.3	-2.7	-3.3	-3.1	-3.5	-3.8	-3.4	-2.8	-3.2	-3.0	-3.1	-2.6	-2.6	-2.2	-2.5	-1.7	-.6	-.1	.4	1.0	1.6	1.6	.8	.3	.9	1.5	.8	1.4	1.5	1.2	.5	-.4	-2.2	-4.1
-3.2	-3.7	-3.5	-2.7	-2.0	-2.4	-1.9	-.4	-.3	-1.3	-2.1	-2.8	-2.4	-1.9	-.7	.0	.5	1.1	1.4	1.6	1.5	1.8	2.1	2.3	2.8	3.5	3.0	2.7	2.5	2.2	1.6	1.3	.9	.7	-2.0	-3.1

Figure 44. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2002
Channel: HIRS15 (700 hPa)
NOAA16, using all observations



-1.0	-1.0	-.9	-.7	-.6	-.5	-.5	-.4	-.2	.2	.8	.1	.0	.1	.3	.1	-.3	-.4	-.5	-.4	-.3	-.2	-.3	-.6	-.5	-.5	-.5	-.7	-.7	-.6	-.7	-.6	-.7	-.8	-.8	-.9
-1.2	-1.1	-1.0	-.6	-.4	-.3	-.4	-.4	-.2	.1	.5	.3	.3	.7	.6	.2	-.9	-1.8	-2.4	-2.0	-1.6	-1.5	-1.4	-.6	-.3	-.5	-.8	-.7	-.6	-.5	-.4	-.5	-.8	-.7	-.9	-1.2
-1.8	-1.4	-.9	.0	.1	-.3	-.3	-.2	.0	-.1	-.1	-.3	-1.3	-1.1	-2.3	-3.1	-2.8	-3.0	-3.0	-2.7	-2.0	-1.7	-1.6	-1.5	-1.5	-1.6	-1.6	-1.3	-1.0	-.4	-.1	.3	.1	-1.2	-2.6	-2.1
-2.6	-2.8	-2.7	-3.1	-2.8	-2.9	-2.2	-.8	-.7	-.4	-1.1	-1.9	-3.5	-4.4	-4.1	-3.9	-4.1	-3.7	-2.5	-2.4	-1.9	-1.8	-2.9	-3.1	-2.7	-2.8	-3.3	-3.0	-2.0	-1.3	-1.0	-.8	-.5	-2.4	-3.3	-3.1
-5.1	-4.3	-5.2	-4.4	-3.4	-3.8	-4.2	-3.4	-2.1	-3.1	-4.0	-4.5	-4.5	-4.6	-4.3	-4.2	-4.3	-4.2	-3.8	-3.0	-3.3	-3.8	-4.7	-3.9	-4.8	-5.2	-3.5	-1.2	-.3	-.7	-1.4	-1.8	-2.4	-4.2	-5.1	-4.8
-5.1	-5.1	-5.8	-4.5	-3.1	-2.0	-.7	-2.1	-4.4	-6.3	-6.2	-5.2	-5.0	-3.5	-3.1	-3.5	-3.0	-1.8	-1.7	-2.8	-2.8	-2.2	-3.4	-2.2	-2.5	-3.3	-1.8	-3.2	-4.2	-3.7	-3.6	-4.2	-4.7	-5.9	-6.9	-6.3
-2.1	-2.7	-3.2	-3.2	-3.3	-3.9	-4.1	-3.2	-2.1	-.7	-.9	-3.1	-3.0	-2.2	-1.6	-1.6	-1.7	-1.0	-.9	.6	-.1	-.5	-3.0	-2.2	-.6	-1.9	-1.9	-2.1	-2.8	-4.2	-2.2	-3.1	-2.3	-1.2	-1.2	-2.1
-1.5	-3.4	-2.7	-3.7	-5.7	-5.6	-2.2	-.2	-.1	-.4	-.6	-1.6	-1.7	-1.6	-2.8	-4.5	-2.9	-3.3	-1.8	-.6	.4	.4	-.7	-.2	-.3	-.4	-.5	-.5	-1.7	-.7	-1.7	-1.9	-2.2	-1.5	-1.5	-1.1
-5.1	-4.5	-3.6	-2.8	-3.3	-3.5	-2.1	-1.9	-2.8	-1.8	-6.9	-6.0	-4.4	-5.1	-4.6	-3.8	-5.4	-5.9	-6.3	-6.9	-7.1	-4.0	-.2	-1.3	-1.8	-2.6	-4.9	-5.9	-2.7	-3.8	-3.2	-4.7	-6.2	-7.3	-7.3	-6.4
-3.0	-2.5	-1.3	-1.9	-1.3	-1.5	-2.4	-4.3	-4.7	-4.4	-10.2	-11.3	-9.3	-8.5	-5.8	-3.2	-1.8	-1.8	-5.0	-8.2	-10.1	-4.5	-1.5	-3.3	-6.0	-5.9	-7.1	-6.3	-6.8	-5.9	-4.5	-6.7	-9.6	-10.9	-8.8	-5.2
-2.8	-2.7	-3.3	-2.1	-1.1	-.6	-.4	-1.1	-1.2	-.9	-2.8	-7.3	-6.7	-4.2	-1.8	-.7	-.2	-.1	-1.0	-6.4	-3.7	-3.7	-4.4	-3.5	-3.2	-4.6	-5.1	-3.9	-3.5	-1.9	-1.7	-1.8	-2.3	-5.1	-3.6	-3.4
-1.1	-1.9	-2.6	-5.7	-7.0	-3.7	-2.3	-1.0	-1.0	-.4	-.1	-1.9	-4.0	-1.7	-1.3	-.8	-.2	-.1	-.1	-1.2	-.6	-.4	-1.8	-2.2	-2.6	-2.3	-2.1	-2.0	-1.3	-2.3	-2.5	-1.1	-.3	-1.0	-2.1	-1.5
-3.4	-4.3	-3.7	-5.8	-8.4	-7.7	-4.7	-3.6	-3.5	-2.6	-1.7	-2.4	-7.2	-6.1	-4.3	-4.1	-3.5	-2.9	-1.6	-1.2	-1.9	-2.8	-2.2	-2.3	-2.9	-4.4	-3.1	-2.0	-2.4	-2.1	-2.6	-1.1	-.8	-1.9	-2.5	-2.9
-3.4	-3.7	-3.8	-3.4	-2.8	-4.3	-4.4	-3.9	-4.0	-3.4	-3.5	-3.5	-4.0	-4.3	-4.1	-4.8	-3.9	-4.1	-4.2	-4.3	-3.5	-3.8	-4.1	-4.1	-3.7	-3.7	-4.3	-3.2	-3.4	-3.6	-3.2	-3.2	-2.7	-2.4	-3.3	-3.7
-3.8	-3.5	-3.6	-3.7	-3.6	-3.5	-3.3	-3.1	-2.9	-2.9	-3.5	-3.0	-3.0	-2.8	-3.5	-3.2	-2.4	-2.6	-3.0	-3.3	-3.3	-3.7	-3.5	-3.7	-3.5	-3.6	-3.2	-3.5	-3.8	-3.7	-3.6	-3.5	-3.1	-3.1	-3.0	-3.1
-3.1	-2.9	-3.5	-3.0	-2.5	-2.1	-2.5	-2.5	-2.4	-2.6	-2.5	-2.6	-3.1	-2.6	-2.6	-2.8	-2.3	-2.7	-2.6	-2.3	-2.7	-3.1	-2.5	-2.0	-1.8	-2.7	-2.4	-2.1	-2.1	-1.9	-2.4	-2.6	-3.0	-3.4	-3.2	-3.4
-2.7	-2.0	-2.2	-2.6	-2.3	-2.0	-2.2	-2.3	-1.9	-1.5	-1.6	-1.1	-1.3	-1.1	-1.3	-1.2	-1.3	-.5	.1	.4	.5	.7	.8	.9	.7	.3	.6	.8	.7	.8	.9	.8	.5	.3	-.8	-2.6
-.9	-1.2	-1.2	-.8	-.5	-.6	-.4	.3	.6	.2	-.2	-.5	-.4	-.3	.2	.5	.6	.8	1.0	1.0	1.0	1.0	1.0	.9	1.0	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	.9	-.4	-.8

Figure 45. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations

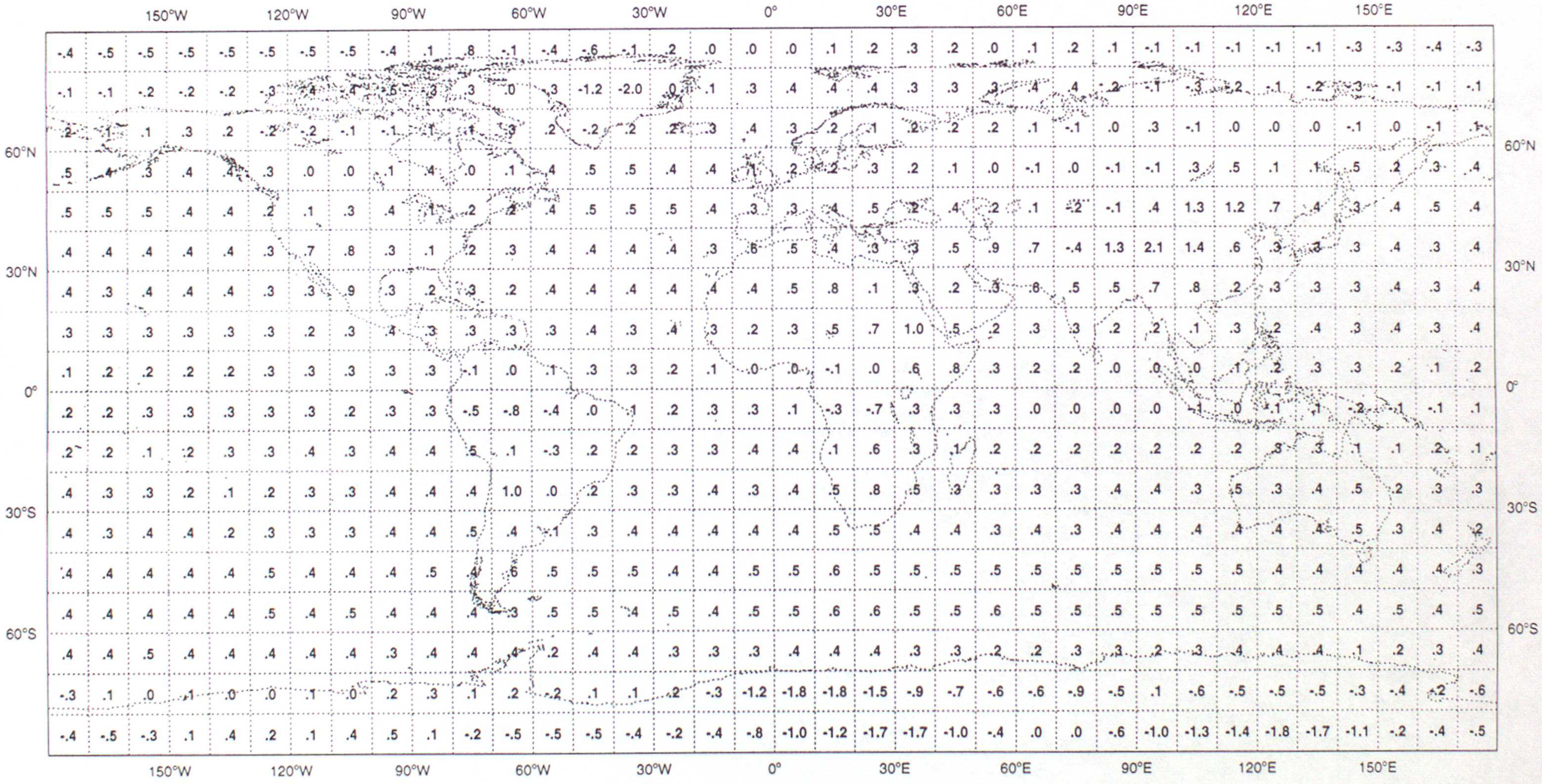

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-.4 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.4 .1 .8 -.1 -.4 -.6 -.1 .2 .0 .0 .0 .1 .2 .3 .2 .0 .1 .2 .1 -.1 -.1 -.1 -.1 -.1 -.3 -.3 -.4 -.3
-.1 -.1 -.2 -.2 -.2 -.3 .4 -.4 .5 .3 .3 .0 .3 -1.2 -2.0 .0 .1 .3 .4 .4 .4 .3 .3 .3 .4 .4 .2 -.1 -.3 .2 .1 -.2 -.3 -.1 -.1 -.1
.2 .1 .1 .3 .2 -.2 -.2 -.1 -.1 -.1 .1 .3 .2 -.2 .2 .2 .3 .4 .3 .2 .1 .2 .2 .2 .1 -.1 .0 .3 -.1 .0 .0 .0 -.1 .0 -.1 .1
.5 .4 .3 .4 .4 .3 .0 .0 .1 .4 .0 .1 .4 .5 .5 .4 .4 .1 .2 .2 .3 .2 .1 .0 -.1 .0 -.1 -.1 .3 .5 .1 .1 .5 .2 .3 .4
.5 .5 .5 .4 .4 .2 .1 .3 .4 .1 .2 .2 .4 .5 .5 .5 .4 .3 .3 .4 .5 .2 .4 .2 .1 -.2 -.1 .4 1.3 1.2 .7 .4 .3 .4 .5 .4
.4 .4 .4 .4 .4 .3 .7 .8 .3 .1 .2 .3 .4 .4 .4 .4 .3 .6 .5 .4 .3 .3 .5 .9 .7 -.4 1.3 2.1 1.4 .6 .3 .3 .3 .4 .3 .4
.4 .3 .4 .4 .4 .3 .3 .9 .3 .2 .3 .2 .4 .4 .4 .4 .4 .4 .5 .8 .1 .3 .2 .3 .6 .5 .5 .7 .8 .2 .3 .3 .3 .4 .3 .4
.3 .3 .3 .3 .3 .3 .2 .3 .4 .3 .3 .3 .3 .4 .3 .4 .3 .2 .3 .5 .7 1.0 .5 .2 .3 .3 .2 .2 .1 .3 .2 .4 .3 .4 .3 .4
.1 .2 .2 .2 .2 .3 .3 .3 .3 .3 -.1 .0 .1 .3 .3 .2 .1 .0 .0 -.1 .0 .6 .8 .3 .2 .2 .0 .0 .0 .1 .2 .3 .3 .2 .1 .2
.2 .2 .3 .3 .3 .3 .3 .2 .3 .3 -.5 -.8 -.4 .0 .1 .2 .3 .3 .1 -.3 -.7 .3 .3 .3 .0 .0 .0 .0 -.1 .0 .1 .1 -.2 -.1 -.1 .1
.2 .2 .1 .2 .3 .3 .4 .3 .4 .4 .5 .1 -.3 .2 .2 .3 .3 .4 .4 .1 .6 .3 .1 .2 .2 .2 .2 .2 .2 .2 .3 .3 .1 .1 .2 .1
.4 .3 .3 .2 .1 .2 .3 .3 .4 .4 .4 1.0 .0 .2 .3 .3 .4 .3 .4 .5 .8 .5 .3 .3 .3 .3 .4 .4 .3 .5 .3 .4 .5 .2 .3 .3
.4 .3 .4 .4 .2 .3 .3 .3 .4 .4 .5 .4 -.1 .3 .4 .4 .4 .4 .4 .5 .5 .4 .4 .3 .4 .3 .4 .4 .4 .4 .4 .4 .5 .3 .4 .2
.4 .4 .4 .4 .4 .5 .4 .4 .4 .5 .4 .6 .5 .5 .5 .4 .4 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .3
.4 .4 .4 .4 .4 .5 .4 .5 .4 .4 .4 .3 .5 .5 .4 .5 .4 .5 .5 .6 .6 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .4 .5
.4 .4 .5 .4 .4 .4 .4 .4 .3 .4 .4 .4 .2 .4 .4 .3 .3 .3 .4 .4 .4 .3 .3 .2 .2 .3 .3 .2 .3 .4 .4 .4 .1 .2 .3 .4
-.3 .1 .0 .1 .0 .0 .1 .0 .2 .3 .1 .2 -.2 .1 .1 .2 -.3 -1.2 -1.8 -1.8 -1.5 -.9 -.7 -.6 -.6 -.9 -.5 .1 -.6 -.5 -.5 -.5 -.3 -.4 .2 -.6
-.4 -.5 -.3 .1 .4 .2 .1 .4 .5 .1 -.2 -.5 -.5 -.5 -.4 -.2 -.4 -.8 -1.0 -1.2 -1.7 -1.7 -1.0 -.4 .0 .0 -.6 -1.0 -1.3 -1.4 -1.8 -1.7 -1.1 -.2 -.4 -.5

Figure 46. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations

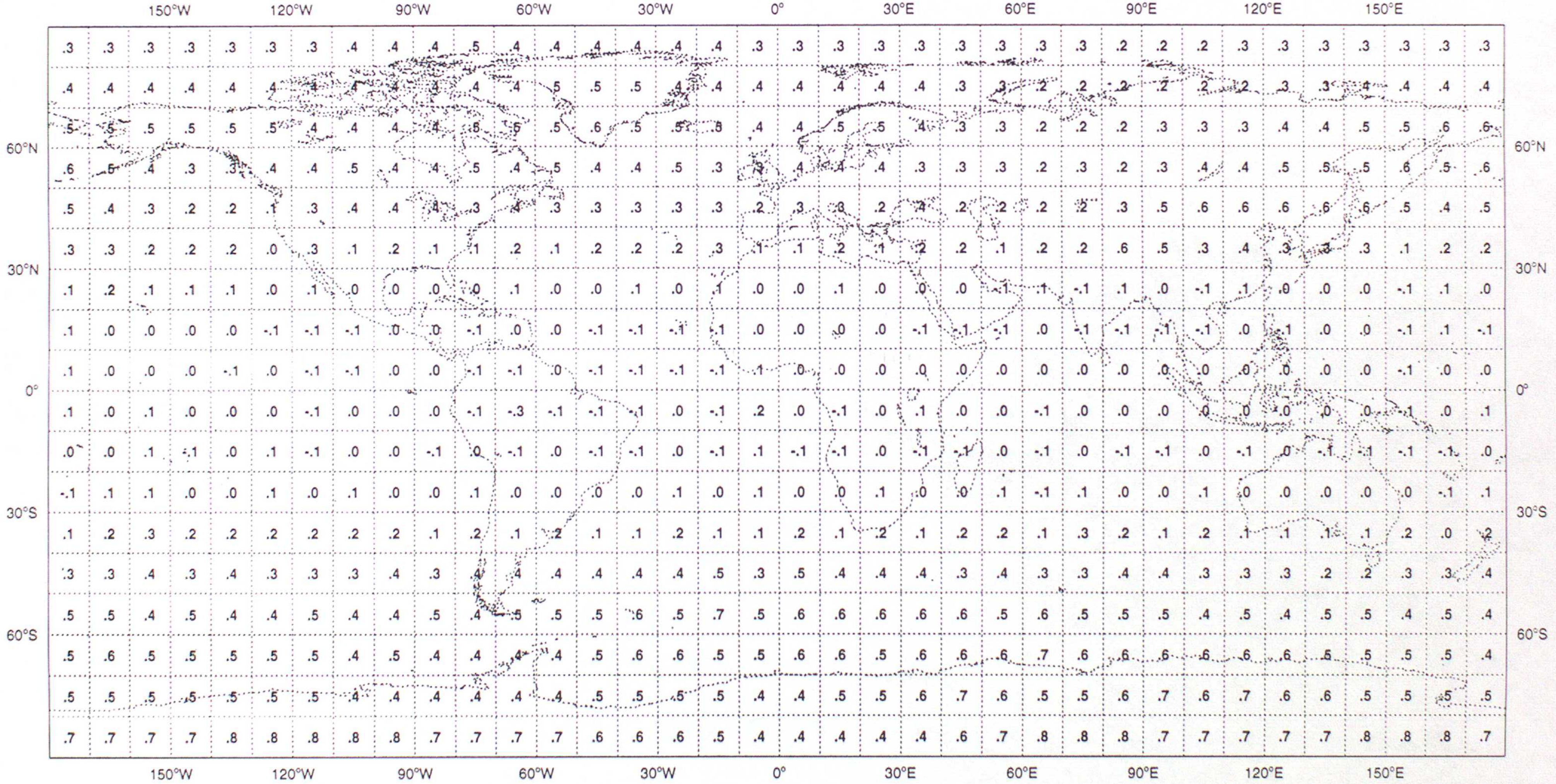

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .2 .3 .3 .3 .3 .3 .3 .3
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .3 .3 .2 .2 .2 .2 .2 .2 .3 .3 .4 .4 .4 .4
.5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .5 .5 .5 .6 .5 .5 .5 .4 .4 .5 .5 .4 .3 .3 .2 .2 .2 .3 .3 .3 .4 .4 .5 .5 .6 .6
.6 .5 .4 .3 .3 .4 .4 .5 .4 .4 .5 .4 .5 .4 .4 .5 .3 .3 .4 .4 .4 .3 .3 .3 .2 .3 .2 .3 .4 .4 .5 .5 .5 .6 .5 .6
.5 .4 .3 .2 .2 .1 .3 .4 .4 .4 .3 .4 .3 .3 .3 .3 .3 .2 .3 .3 .2 .4 .2 .2 .2 .2 .3 .5 .6 .6 .6 .6 .6 .5 .4 .5
.3 .3 .2 .2 .2 .0 .3 .1 .2 .1 .1 .2 .1 .2 .2 .2 .3 .1 .1 .2 .1 .2 .2 .1 .2 .2 .6 .5 .3 .4 .3 .3 .3 .1 .2 .2
.1 .2 .1 .1 .1 .0 .1 .0 .0 .0 .0 .1 .0 .0 .1 .0 .1 .0 .0 .1 .0 .0 .0 -.1 .1 -.1 .1 .0 -.1 .1 .0 .0 .0 -.1 .1 .0
.1 .0 .0 .0 .0 -.1 -.1 -.1 .0 .0 -.1 .0 .0 -.1 -.1 -.1 -.1 .0 .0 .0 .0 -.1 -.1 -.1 .0 -.1 -.1 -.1 -.1 .0 -.1 .0 .0 -.1 .1 -.1
.1 .0 .0 .0 -.1 .0 -.1 -.1 .0 .0 -.1 -.1 .0 -.1 -.1 -.1 -.1 .1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 -.1 .0 .0
.1 .0 .1 .0 .0 .0 -.1 .0 .0 .0 -.1 -.3 -.1 -.1 -.1 .0 -.1 .2 .0 -.1 .0 .1 .0 .0 -.1 .0 .0 .0 .0 .0 .0 .0 .0 -.1 .0 .1
.0 .0 .1 -.1 .0 .1 -.1 .0 .0 -.1 .0 -.1 .0 -.1 -.1 .0 -.1 .1 -.1 -.1 .0 -.1 -.1 .0 -.1 .0 -.1 -.1 .0 -.1 .0 -.1 -.1 -.1 -.1 .0
-.1 .1 .1 .0 .0 .1 .0 .1 .0 .0 .1 .0 .0 .0 .0 .1 .0 .1 .0 .0 .1 .0 .0 .1 -.1 .1 .0 .0 .1 .0 .0 .0 .0 .0 -.1 .1
.1 .2 .3 .2 .2 .2 .2 .2 .2 .1 .2 .1 .2 .1 .1 .2 .1 .1 .2 .1 .2 .1 .2 .2 .1 .3 .2 .1 .2 .1 .1 .1 .1 .2 .0 .2
.3 .3 .4 .3 .4 .3 .3 .3 .4 .3 .4 .4 .4 .4 .4 .4 .5 .3 .5 .4 .4 .4 .3 .4 .3 .3 .4 .4 .3 .3 .3 .2 .2 .3 .3 .4
.5 .5 .4 .5 .4 .4 .5 .4 .4 .5 .4 .5 .5 .5 .6 .5 .7 .5 .6 .6 .6 .6 .6 .5 .6 .5 .5 .5 .4 .5 .4 .5 .5 .4 .5 .4
.5 .6 .5 .5 .5 .5 .5 .4 .5 .4 .4 .4 .4 .5 .6 .6 .5 .5 .6 .6 .5 .6 .6 .6 .7 .6 .6 .6 .6 .6 .6 .5 .5 .5 .5 .4
.5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .5 .5 .6 .7 .6 .5 .5 .6 .7 .6 .7 .6 .6 .5 .5 .5 .5
.7 .7 .7 .7 .8 .8 .8 .8 .8 .7 .7 .7 .7 .6 .6 .6 .5 .4 .4 .4 .4 .4 .6 .7 .8 .8 .8 .7 .7 .7 .7 .7 .8 .8 .8 .7

Figure 47. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2002

Channel: HIRS4 (400 hPa)

NOAA16, using all observations

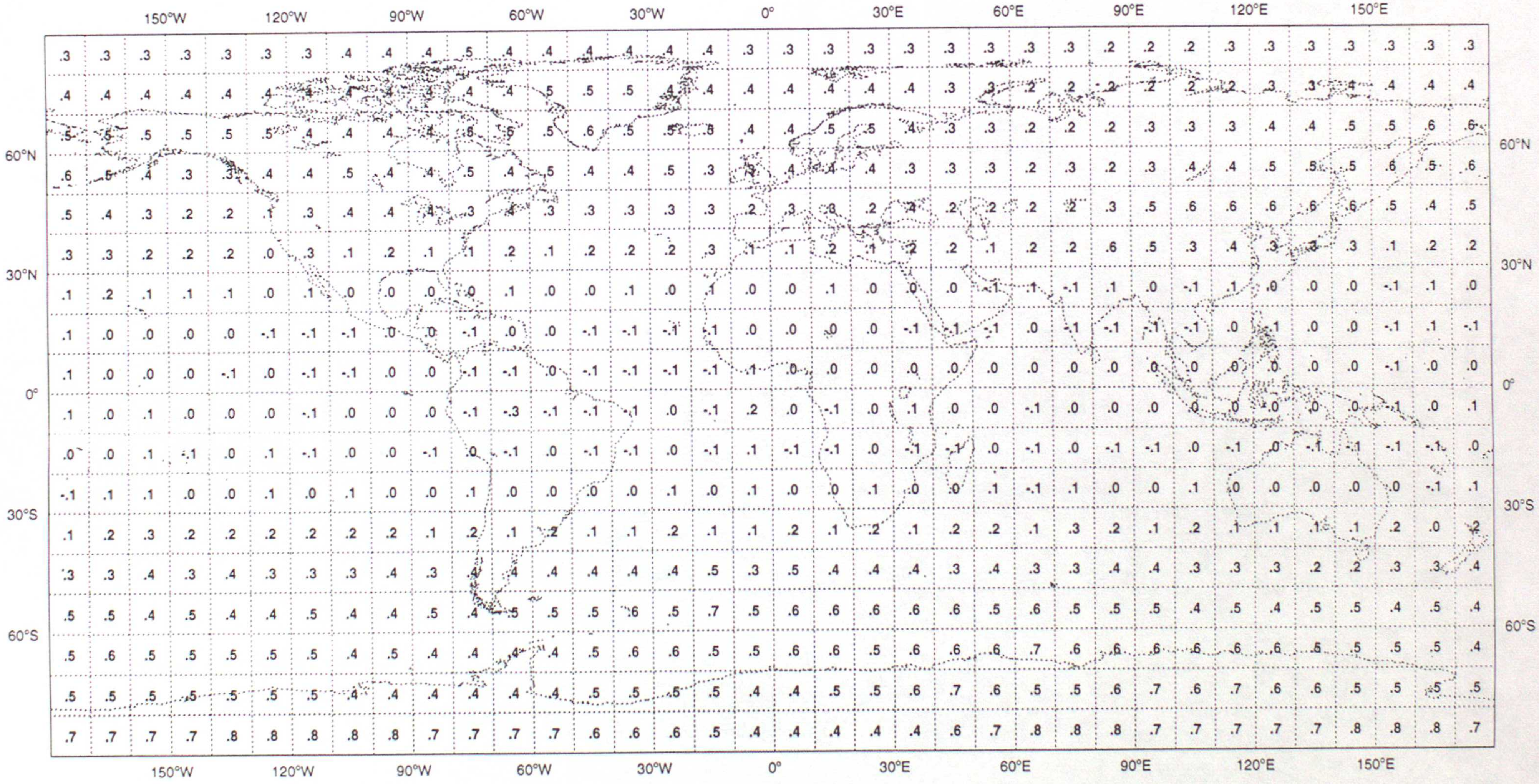
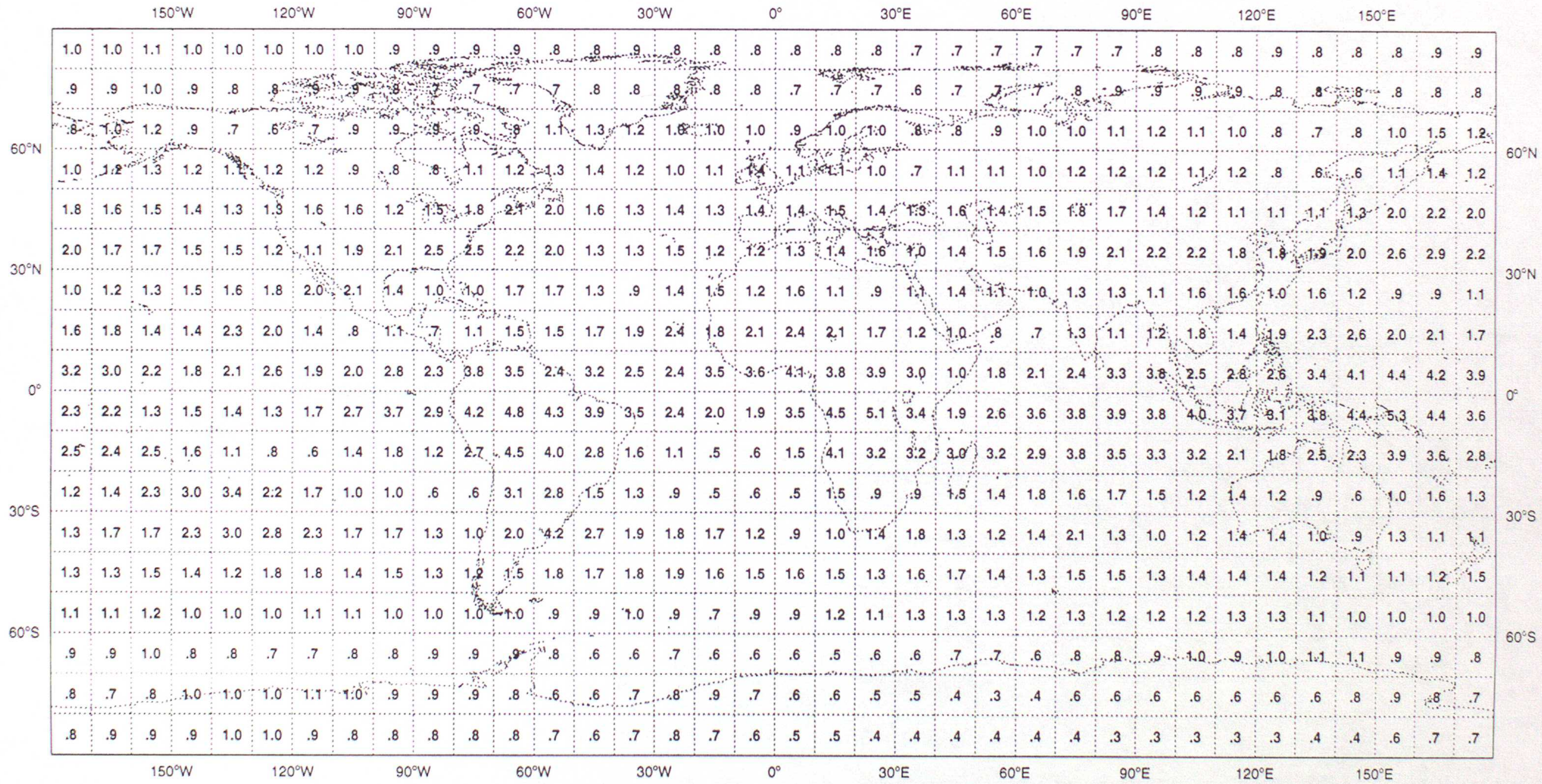
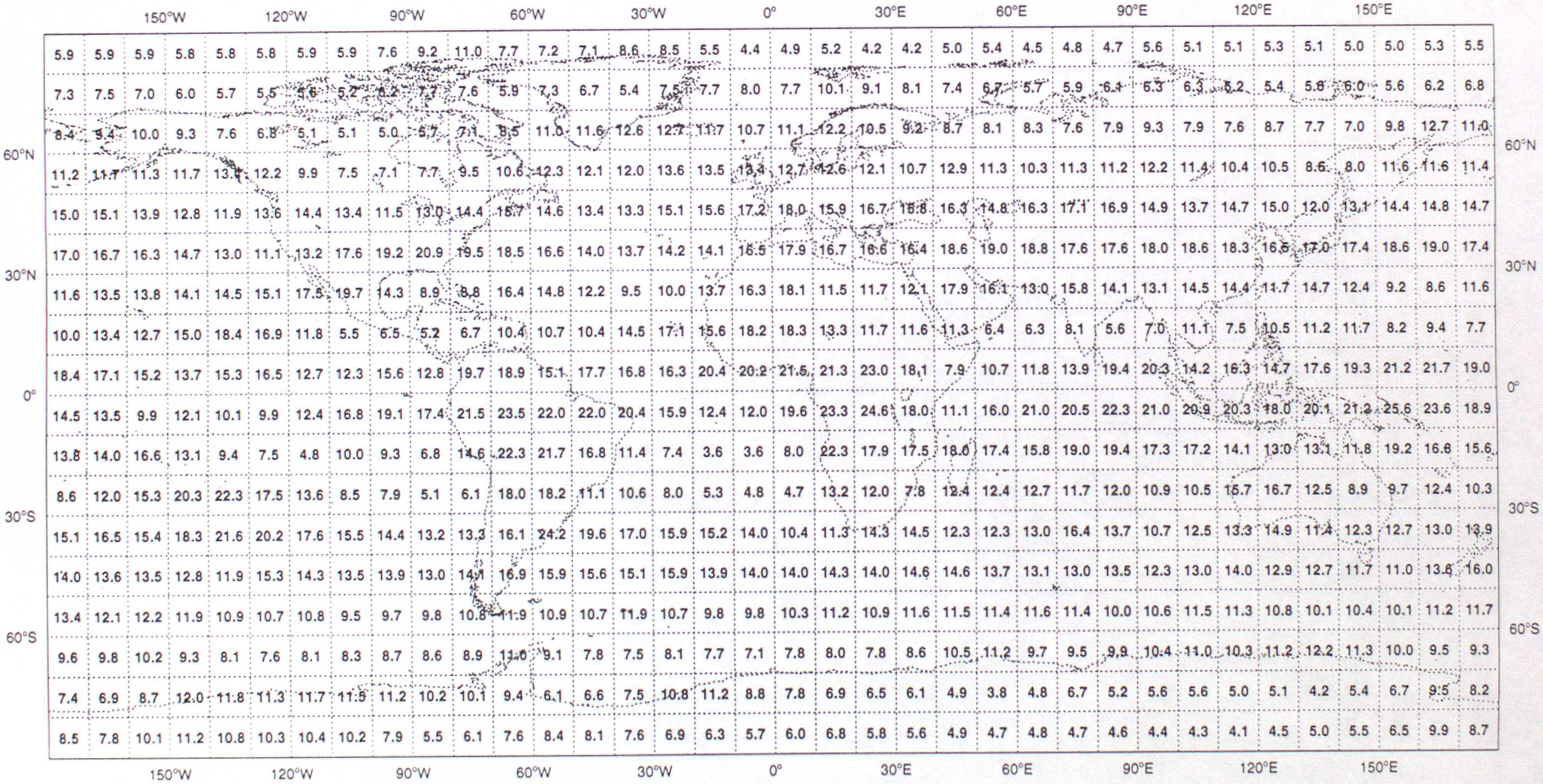

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .2 .3 .3 .3 .3 .3 .3 .3
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .3 .3 .2 .2 .2 .2 .2 .2 .3 .3 .4 .4 .4 .4
.5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .6 .5 .5 .6 .5 .5 .6 .4 .4 .5 .5 .4 .3 .3 .2 .2 .2 .3 .3 .3 .4 .4 .5 .5 .6 .6
.6 .5 .4 .3 .3 .4 .4 .5 .4 .4 .5 .4 .5 .4 .4 .5 .3 .3 .4 .4 .4 .3 .3 .3 .2 .3 .2 .3 .4 .4 .5 .5 .5 .6 .5 .6
.5 .4 .3 .2 .2 .1 .3 .4 .4 .4 .3 .4 .3 .3 .3 .3 .3 .2 .3 .3 .2 .4 .2 .2 .2 .2 .3 .5 .6 .6 .6 .6 .6 .5 .4 .5
.3 .3 .2 .2 .2 .0 .3 .1 .2 .1 .1 .2 .1 .2 .2 .2 .3 .1 .1 .2 .1 .2 .2 .1 .2 .2 .6 .5 .3 .4 .3 .3 .3 .1 .2 .2
.1 .2 .1 .1 .1 .0 .1 .0 .0 .0 .0 .1 .0 .0 .1 .0 .1 .0 .0 .1 .0 .0 .0 -.1 .1 -.1 .1 .0 -.1 .1 .0 .0 .0 -.1 .1 .0
.1 .0 .0 .0 .0 -.1 -.1 -.1 .0 .0 -.1 .0 .0 -.1 -.1 -.1 -.1 .0 .0 .0 .0 -.1 -.1 -.1 .0 -.1 -.1 -.1 -.1 .0 -.1 .0 .0 -.1 .1 -.1
.1 .0 .0 .0 -.1 .0 -.1 -.1 .0 .0 -.1 -.1 .0 -.1 -.1 -.1 -.1 .1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 -.1 .0 .0
.1 .0 .1 .0 .0 .0 -.1 .0 .0 .0 -.1 -.3 -.1 -.1 -.1 .0 -.1 .2 .0 -.1 .0 .1 .0 .0 -.1 .0 .0 .0 .0 .0 .0 .0 .0 -.1 .0 .1
.0 .0 .1 -.1 .0 .1 -.1 .0 .0 -.1 .0 -.1 .0 -.1 -.1 .0 -.1 .1 -.1 -.1 .0 -.1 -.1 .0 -.1 .0 -.1 -.1 .0 -.1 .0 -.1 -.1 -.1 -.1 .0
-.1 .1 .1 .0 .0 .1 .0 .1 .0 .0 .1 .0 .0 .0 .0 .1 .0 .1 .0 .0 .1 .0 .0 .1 -.1 .1 .0 .0 .1 .0 .0 .0 .0 .0 -.1 .1
.1 .2 .3 .2 .2 .2 .2 .2 .2 .1 .2 .1 .2 .1 .1 .2 .1 .1 .2 .1 .2 .1 .2 .2 .1 .3 .2 .1 .2 .1 .1 .1 .1 .2 .0 .2
.3 .3 .4 .3 .4 .3 .3 .3 .4 .3 .4 .4 .4 .4 .4 .4 .5 .3 .5 .4 .4 .4 .3 .4 .3 .3 .4 .4 .3 .3 .3 .2 .2 .3 .3 .4
.5 .5 .4 .5 .4 .4 .5 .4 .4 .5 .4 .5 .5 .5 .6 .5 .7 .5 .6 .6 .6 .6 .6 .5 .6 .5 .5 .5 .4 .5 .4 .5 .5 .4 .5 .4
.5 .6 .5 .5 .5 .5 .5 .4 .5 .4 .4 .4 .4 .5 .6 .6 .5 .5 .6 .6 .5 .6 .6 .6 .7 .6 .6 .6 .6 .6 .6 .5 .5 .5 .5 .4
.5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .5 .5 .6 .7 .6 .5 .5 .6 .7 .6 .7 .6 .6 .5 .5 .5 .5
.7 .7 .7 .7 .8 .8 .8 .8 .8 .7 .7 .7 .7 .6 .6 .6 .5 .4 .4 .4 .4 .4 .6 .7 .8 .8 .8 .7 .7 .7 .7 .7 .8 .8 .8 .7

Figure 48. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2002
Channel: HIRS4 (400 hPa)
NOAA16, using all observations



1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	.9	.9	.9	.9	.8	.8	.9	.8	.8	.8	.8	.8	.8	.7	.7	.7	.7	.7	.7	.8	.8	.8	.9	.8	.8	.8	.9	.9
.9	.9	1.0	.9	.8	.8	.9	.9	.8	.7	.7	.7	.7	.8	.8	.8	.8	.8	.7	.7	.7	.6	.7	.7	.7	.8	.9	.9	.9	.9	.8	.8	.8	.8	.8	.8
.8	1.0	1.2	.9	.7	.6	.7	.9	.9	.9	.9	.8	1.1	1.3	1.2	1.6	1.0	1.0	.9	1.0	1.0	.8	.8	.9	1.0	1.0	1.1	1.2	1.1	1.0	.8	.7	.8	1.0	1.5	1.2
1.0	1.2	1.3	1.2	1.1	1.2	1.2	.9	.8	.8	1.1	1.2	1.3	1.4	1.2	1.0	1.1	1.4	1.1	1.1	1.0	.7	1.1	1.1	1.0	1.2	1.2	1.2	1.1	1.2	.8	.6	.6	1.1	1.4	1.2
1.8	1.6	1.5	1.4	1.3	1.3	1.6	1.6	1.2	1.5	1.8	2.1	2.0	1.6	1.3	1.4	1.3	1.4	1.4	1.5	1.4	1.3	1.6	1.4	1.5	1.8	1.7	1.4	1.2	1.1	1.1	1.1	1.3	2.0	2.2	2.0
2.0	1.7	1.7	1.5	1.5	1.2	1.1	1.9	2.1	2.5	2.5	2.2	2.0	1.3	1.3	1.5	1.2	1.2	1.3	1.4	1.6	1.0	1.4	1.5	1.6	1.9	2.1	2.2	2.2	1.8	1.8	1.9	2.0	2.6	2.9	2.2
1.0	1.2	1.3	1.5	1.6	1.8	2.0	2.1	1.4	1.0	1.0	1.7	1.7	1.3	.9	1.4	1.5	1.2	1.6	1.1	.9	1.1	1.4	1.1	1.0	1.3	1.3	1.1	1.6	1.6	1.0	1.6	1.2	.9	.9	1.1
1.6	1.8	1.4	1.4	2.3	2.0	1.4	.8	1.1	.7	1.1	1.5	1.5	1.7	1.9	2.4	1.8	2.1	2.4	2.1	1.7	1.2	1.0	.8	.7	1.3	1.1	1.2	1.8	1.4	1.9	2.3	2.6	2.0	2.1	1.7
3.2	3.0	2.2	1.8	2.1	2.6	1.9	2.0	2.8	2.3	3.8	3.5	2.4	3.2	2.5	2.4	3.5	3.6	4.1	3.8	3.9	3.0	1.0	1.8	2.1	2.4	3.3	3.8	2.5	2.8	2.6	3.4	4.1	4.4	4.2	3.9
2.3	2.2	1.3	1.5	1.4	1.3	1.7	2.7	3.7	2.9	4.2	4.8	4.3	3.9	3.5	2.4	2.0	1.9	3.5	4.5	5.1	3.4	1.9	2.6	3.6	3.8	3.9	3.8	4.0	3.7	3.1	3.8	4.4	5.3	4.4	3.6
2.5	2.4	2.5	1.6	1.1	.8	.6	1.4	1.8	1.2	2.7	4.5	4.0	2.8	1.6	1.1	.5	.6	1.5	4.1	3.2	3.2	3.0	3.2	2.9	3.8	3.5	3.3	3.2	2.1	1.8	2.5	2.3	3.9	3.6	2.8
1.2	1.4	2.3	3.0	3.4	2.2	1.7	1.0	1.0	.6	.6	3.1	2.8	1.5	1.3	.9	.5	.6	.5	1.5	.9	.9	1.5	1.4	1.8	1.6	1.7	1.5	1.2	1.4	1.2	.9	.6	1.0	1.6	1.3
1.3	1.7	1.7	2.3	3.0	2.8	2.3	1.7	1.7	1.3	1.0	2.0	4.2	2.7	1.9	1.8	1.7	1.2	.9	1.0	1.4	1.8	1.3	1.2	1.4	2.1	1.3	1.0	1.2	1.4	1.4	1.0	.9	1.3	1.1	1.1
1.3	1.3	1.5	1.4	1.2	1.8	1.8	1.4	1.5	1.3	1.2	1.5	1.8	1.7	1.8	1.9	1.6	1.5	1.6	1.5	1.3	1.6	1.7	1.4	1.3	1.5	1.5	1.3	1.4	1.4	1.4	1.2	1.1	1.1	1.2	1.5
1.1	1.1	1.2	1.0	1.0	1.0	1.1	1.1	1.0	1.0	1.0	1.0	.9	.9	1.0	.9	.7	.9	.9	1.2	1.1	1.3	1.3	1.3	1.2	1.3	1.2	1.2	1.2	1.3	1.3	1.1	1.0	1.0	1.0	1.0
.9	.9	1.0	.8	.8	.7	.7	.8	.8	.9	.9	.9	.8	.6	.6	.7	.6	.6	.6	.5	.6	.6	.7	.7	.6	.8	.8	.9	1.0	.9	1.0	1.1	1.1	.9	.9	.8
.8	.7	.8	1.0	1.0	1.0	1.1	1.0	.9	.9	.9	.8	.6	.6	.7	.8	.9	.7	.6	.6	.5	.5	.4	.3	.4	.6	.6	.6	.6	.6	.6	.6	.8	.9	.8	.7
.8	.9	.9	.9	1.0	1.0	.9	.8	.8	.8	.8	.8	.7	.6	.7	.8	.7	.6	.5	.5	.4	.4	.4	.4	.4	.4	.3	.3	.3	.3	.3	.4	.4	.6	.7	.7

Figure 49. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2002
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations

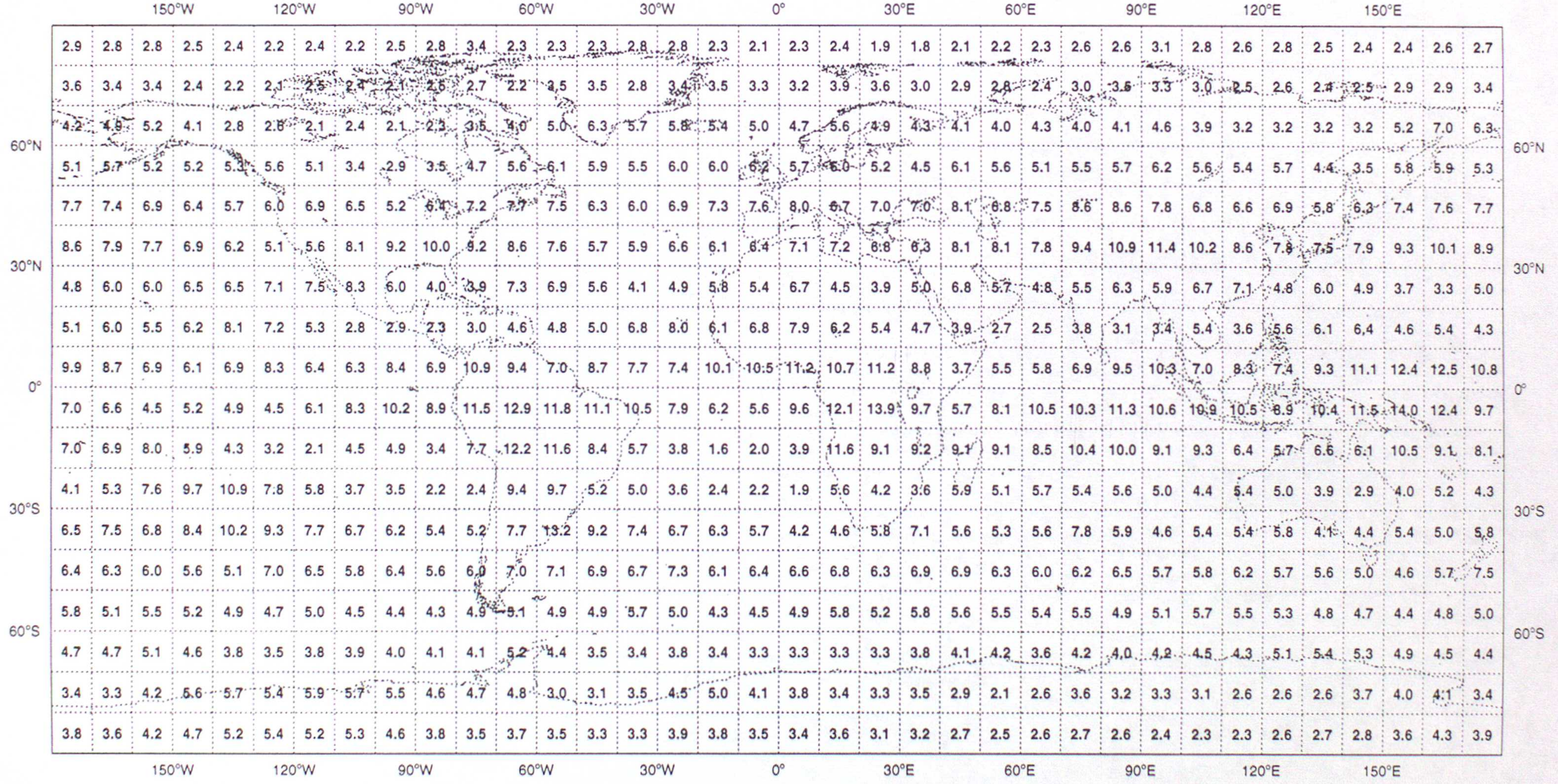


5.9	5.9	5.9	5.8	5.8	5.8	5.9	5.9	7.6	9.2	11.0	7.7	7.2	7.1	8.6	8.5	5.5	4.4	4.9	5.2	4.2	4.2	5.0	5.4	4.5	4.8	4.7	5.6	5.1	5.1	5.3	5.1	5.0	5.0	5.3	5.5
7.3	7.5	7.0	6.0	5.7	5.5	5.6	5.2	6.2	7.7	7.6	5.9	7.3	6.7	5.4	7.5	7.7	8.0	7.7	10.1	9.1	8.1	7.4	6.7	5.7	5.9	6.4	6.3	6.3	5.2	5.4	5.8	6.0	5.6	6.2	6.8
8.4	9.4	10.0	9.3	7.6	6.8	5.1	5.1	5.0	5.7	7.1	8.5	11.0	11.6	12.6	12.7	11.7	10.7	11.1	12.2	10.5	9.2	8.7	8.1	8.3	7.6	7.9	9.3	7.9	7.6	8.7	7.7	7.0	9.8	12.7	11.0
11.2	11.7	11.3	11.7	13.4	12.2	9.9	7.5	7.1	7.7	9.5	10.6	12.3	12.1	12.0	13.6	13.5	13.4	12.7	12.6	12.1	10.7	12.9	11.3	10.3	11.3	11.2	12.2	11.4	10.4	10.5	8.6	8.0	11.6	11.6	11.4
15.0	15.1	13.9	12.8	11.9	13.6	14.4	13.4	11.5	13.0	14.4	15.7	14.6	13.4	13.3	15.1	15.6	17.2	18.0	15.9	16.7	15.8	16.3	14.8	16.3	17.1	16.9	14.9	13.7	14.7	15.0	12.0	13.1	14.4	14.8	14.7
17.0	16.7	16.3	14.7	13.0	11.1	13.2	17.6	19.2	20.9	19.5	18.5	16.6	14.0	13.7	14.2	14.1	16.5	17.9	16.7	16.6	16.4	18.6	19.0	18.8	17.6	17.6	18.0	18.6	18.3	16.5	17.0	17.4	18.6	19.0	17.4
11.6	13.5	13.8	14.1	14.5	15.1	17.5	19.7	14.3	8.9	8.8	16.4	14.8	12.2	9.5	10.0	13.7	16.3	18.1	11.5	11.7	12.1	17.9	16.1	13.0	15.8	14.1	13.1	14.5	14.4	11.7	14.7	12.4	9.2	8.6	11.6
10.0	13.4	12.7	15.0	18.4	16.9	11.8	5.5	6.5	5.2	6.7	10.4	10.7	10.4	14.5	17.1	15.6	18.2	18.3	13.3	11.7	11.6	11.3	6.4	6.3	8.1	5.6	7.0	11.1	7.5	10.5	11.2	11.7	8.2	9.4	7.7
18.4	17.1	15.2	13.7	15.3	16.5	12.7	12.3	15.6	12.8	19.7	18.9	15.1	17.7	16.8	16.3	20.4	20.2	21.5	21.3	23.0	18.1	7.9	10.7	11.8	13.9	19.4	20.3	14.2	16.3	14.7	17.6	19.3	21.2	21.7	19.0
14.5	13.5	9.9	12.1	10.1	9.9	12.4	16.8	19.1	17.4	21.5	23.5	22.0	22.0	20.4	15.9	12.4	12.0	19.6	23.3	24.6	18.0	11.1	16.0	21.0	20.5	22.3	21.0	20.9	20.3	18.0	20.1	21.2	25.6	23.6	18.9
13.8	14.0	16.6	13.1	9.4	7.5	4.8	10.0	9.3	6.8	14.6	22.3	21.7	16.8	11.4	7.4	3.6	3.6	8.0	22.3	17.9	17.5	18.0	17.4	15.8	19.0	19.4	17.3	17.2	14.1	13.0	13.1	11.8	19.2	16.6	15.6
8.6	12.0	15.3	20.3	22.3	17.5	13.6	8.5	7.9	5.1	6.1	18.0	18.2	11.1	10.6	8.0	5.3	4.8	4.7	13.2	12.0	7.8	12.4	12.4	12.7	11.7	12.0	10.9	10.5	15.7	16.7	12.5	8.9	9.7	12.4	10.3
15.1	16.5	15.4	18.3	21.6	20.2	17.6	15.5	14.4	13.2	13.3	16.1	24.2	19.6	17.0	15.9	15.2	14.0	10.4	11.3	14.3	14.5	12.3	12.3	13.0	16.4	13.7	10.7	12.5	13.3	14.9	11.4	12.3	12.7	13.0	13.9
14.0	13.6	13.5	12.8	11.9	15.3	14.3	13.5	13.9	13.0	14.1	16.9	15.9	15.6	15.1	15.9	13.9	14.0	14.0	14.3	14.0	14.6	14.6	13.7	13.1	13.0	13.5	12.3	13.0	14.0	12.9	12.7	11.7	11.0	13.6	16.0
13.4	12.1	12.2	11.9	10.9	10.7	10.8	9.5	9.7	9.8	10.8	11.9	10.9	10.7	11.9	10.7	9.8	9.8	10.3	11.2	10.9	11.6	11.5	11.4	11.6	11.4	10.0	10.6	11.5	11.3	10.8	10.1	10.4	10.1	11.2	11.7
9.6	9.8	10.2	9.3	8.1	7.6	8.1	8.3	8.7	8.6	8.9	11.0	9.1	7.8	7.5	8.1	7.7	7.1	7.8	8.0	7.8	8.6	10.5	11.2	9.7	9.5	9.9	10.4	11.0	10.3	11.2	12.2	11.3	10.0	9.5	9.3
7.4	6.9	8.7	12.0	11.8	11.3	11.7	11.5	11.2	10.2	10.1	9.4	6.1	6.6	7.5	10.8	11.2	8.8	7.8	6.9	6.5	6.1	4.9	3.8	4.8	6.7	5.2	5.6	5.6	5.0	5.1	4.2	5.4	6.7	9.5	8.2
8.5	7.8	10.1	11.2	10.8	10.3	10.4	10.2	7.9	5.5	6.1	7.6	8.4	8.1	7.6	6.9	6.3	5.7	6.0	6.8	5.8	5.6	4.9	4.7	4.8	4.7	4.6	4.4	4.3	4.1	4.5	5.0	5.5	6.5	9.9	8.7

Figure 50. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2002

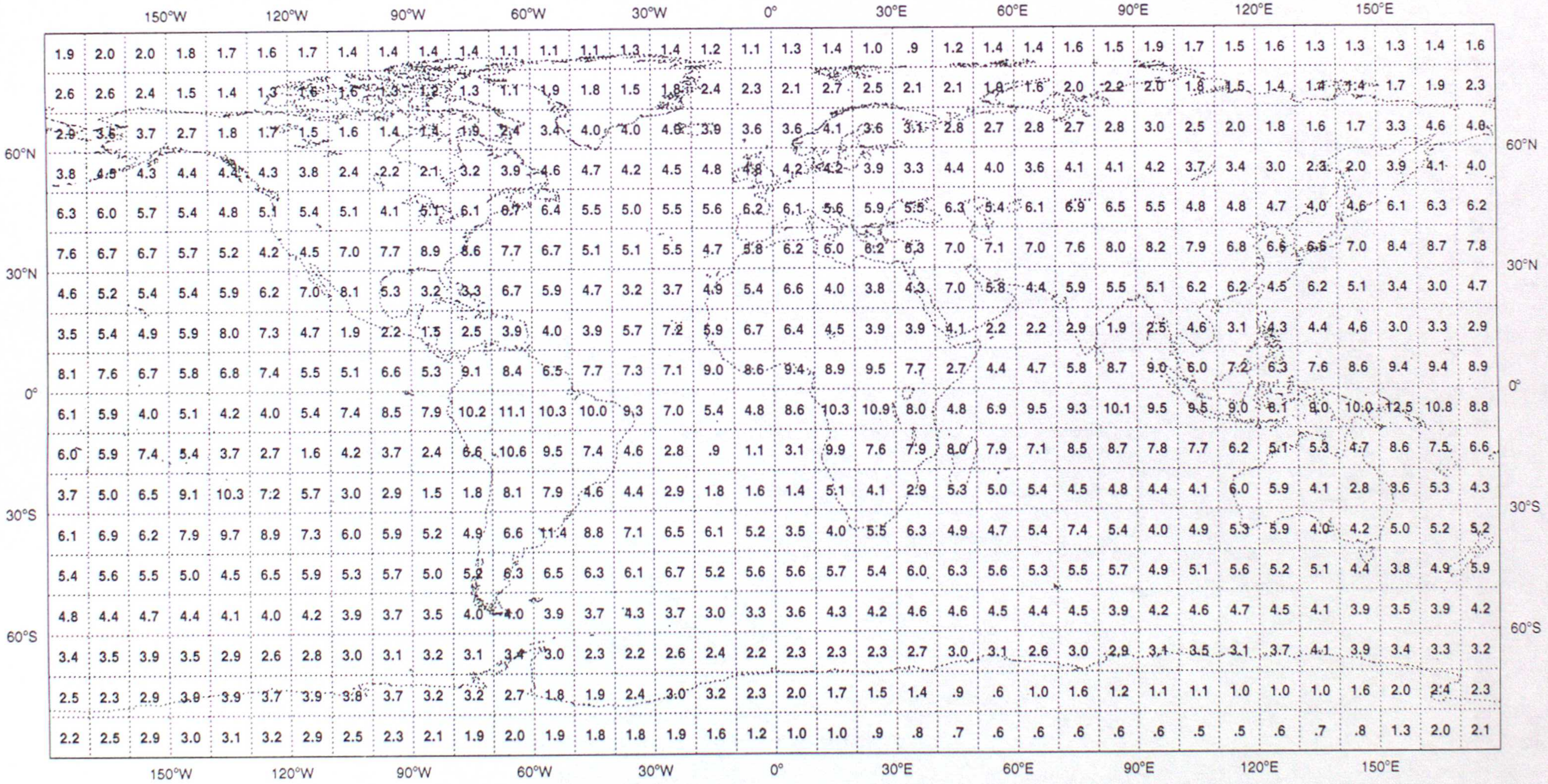
Channel: AMSUA-5 (700 hPa)

NOAA16, using all observations



2.9	2.8	2.8	2.5	2.4	2.2	2.4	2.2	2.5	2.8	3.4	2.3	2.3	2.3	2.8	2.8	2.3	2.1	2.3	2.4	1.9	1.8	2.1	2.2	2.3	2.6	2.6	3.1	2.8	2.6	2.8	2.5	2.4	2.4	2.6	2.7
3.6	3.4	3.4	2.4	2.2	2.1	2.5	2.4	2.1	2.5	2.7	2.2	3.5	3.5	2.8	3.4	3.5	3.3	3.2	3.9	3.6	3.0	2.9	2.8	2.4	3.0	3.6	3.3	3.0	2.5	2.6	2.4	2.5	2.9	2.9	3.4
4.2	4.9	5.2	4.1	2.8	2.8	2.1	2.4	2.1	2.3	3.5	4.0	5.0	6.3	5.7	5.8	5.4	5.0	4.7	5.6	4.9	4.3	4.1	4.0	4.3	4.0	4.1	4.6	3.9	3.2	3.2	3.2	3.2	5.2	7.0	6.3
5.1	5.7	5.2	5.2	5.3	5.6	5.1	3.4	2.9	3.5	4.7	5.6	6.1	5.9	5.5	6.0	6.0	6.2	5.7	6.0	5.2	4.5	6.1	5.6	5.1	5.5	5.7	6.2	5.6	5.4	5.7	4.4	3.5	5.8	5.9	5.3
7.7	7.4	6.9	6.4	5.7	6.0	6.9	6.5	5.2	6.4	7.2	7.7	7.5	6.3	6.0	6.9	7.3	7.6	8.0	6.7	7.0	7.0	8.1	6.8	7.5	8.6	8.6	7.8	6.8	6.6	6.9	5.8	6.3	7.4	7.6	7.7
8.6	7.9	7.7	6.9	6.2	5.1	5.6	8.1	9.2	10.0	9.2	8.6	7.6	5.7	5.9	6.6	6.1	6.4	7.1	7.2	6.8	6.3	8.1	8.1	7.8	9.4	10.9	11.4	10.2	8.6	7.8	7.5	7.9	9.3	10.1	8.9
4.8	6.0	6.0	6.5	6.5	7.1	7.5	8.3	6.0	4.0	3.9	7.3	6.9	5.6	4.1	4.9	5.8	5.4	6.7	4.5	3.9	5.0	6.8	5.7	4.8	5.5	6.3	5.9	6.7	7.1	4.8	6.0	4.9	3.7	3.3	5.0
5.1	6.0	5.5	6.2	8.1	7.2	5.3	2.8	2.9	2.3	3.0	4.6	4.8	5.0	6.8	8.0	6.1	6.8	7.9	6.2	5.4	4.7	3.9	2.7	2.5	3.8	3.1	3.4	5.4	3.6	5.6	6.1	6.4	4.6	5.4	4.3
9.9	8.7	6.9	6.1	6.9	8.3	6.4	6.3	8.4	6.9	10.9	9.4	7.0	8.7	7.7	7.4	10.1	10.5	11.2	10.7	11.2	8.8	3.7	5.5	5.8	6.9	9.5	10.3	7.0	8.3	7.4	9.3	11.1	12.4	12.5	10.8
7.0	6.6	4.5	5.2	4.9	4.5	6.1	8.3	10.2	8.9	11.5	12.9	11.8	11.1	10.5	7.9	6.2	5.6	9.6	12.1	13.9	9.7	5.7	8.1	10.5	10.3	11.3	10.6	10.9	10.5	8.9	10.4	11.5	14.0	12.4	9.7
7.0	6.9	8.0	5.9	4.3	3.2	2.1	4.5	4.9	3.4	7.7	12.2	11.6	8.4	5.7	3.8	1.6	2.0	3.9	11.6	9.1	9.2	9.1	9.1	8.5	10.4	10.0	9.1	9.3	6.4	5.7	6.6	6.1	10.5	9.1	8.1
4.1	5.3	7.6	9.7	10.9	7.8	5.8	3.7	3.5	2.2	2.4	9.4	9.7	5.2	5.0	3.6	2.4	2.2	1.9	5.6	4.2	3.6	5.9	5.1	5.7	5.4	5.6	5.0	4.4	5.4	5.0	3.9	2.9	4.0	5.2	4.3
6.5	7.5	6.8	8.4	10.2	9.3	7.7	6.7	6.2	5.4	5.2	7.7	13.2	9.2	7.4	6.7	6.3	5.7	4.2	4.6	5.8	7.1	5.6	5.3	5.6	7.8	5.9	4.6	5.4	5.4	5.8	4.1	4.4	5.4	5.0	5.8
6.4	6.3	6.0	5.6	5.1	7.0	6.5	5.8	6.4	5.6	6.0	7.0	7.1	6.9	6.7	7.3	6.1	6.4	6.6	6.8	6.3	6.9	6.9	6.3	6.0	6.2	6.5	5.7	5.8	6.2	5.7	5.6	5.0	4.6	5.7	7.5
5.8	5.1	5.5	5.2	4.9	4.7	5.0	4.5	4.4	4.3	4.9	5.1	4.9	4.9	5.7	5.0	4.3	4.5	4.9	5.8	5.2	5.8	5.6	5.5	5.4	5.5	4.9	5.1	5.7	5.5	5.3	4.8	4.7	4.4	4.8	5.0
4.7	4.7	5.1	4.6	3.8	3.5	3.8	3.9	4.0	4.1	4.1	5.2	4.4	3.5	3.4	3.8	3.4	3.3	3.3	3.3	3.3	3.8	4.1	4.2	3.6	4.2	4.0	4.2	4.5	4.3	5.1	5.4	5.3	4.9	4.5	4.4
3.4	3.3	4.2	5.6	5.7	5.4	5.9	5.7	5.5	4.6	4.7	4.8	3.0	3.1	3.5	4.5	5.0	4.1	3.8	3.4	3.3	3.5	2.9	2.1	2.6	3.6	3.2	3.3	3.1	2.6	2.6	2.6	3.7	4.0	4.1	3.4
3.8	3.6	4.2	4.7	5.2	5.4	5.2	5.3	4.6	3.8	3.5	3.7	3.5	3.3	3.3	3.9	3.8	3.5	3.4	3.6	3.1	3.2	2.7	2.5	2.6	2.7	2.6	2.4	2.3	2.3	2.6	2.7	2.8	3.6	4.3	3.9

Figure 51. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2002
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
1.9 2.0 2.0 1.8 1.7 1.6 1.7 1.4 1.4 1.4 1.4 1.1 1.1 1.1 1.3 1.4 1.2 1.1 1.3 1.4 1.0 .9 1.2 1.4 1.4 1.6 1.5 1.9 1.7 1.5 1.6 1.3 1.3 1.3 1.4 1.6
2.6 2.6 2.4 1.5 1.4 1.3 1.6 1.6 1.3 1.2 1.3 1.1 1.9 1.8 1.5 1.8 2.4 2.3 2.1 2.7 2.5 2.1 2.1 1.8 1.6 2.0 2.2 2.0 1.8 1.5 1.4 1.4 1.4 1.7 1.9 2.3
2.9 3.6 3.7 2.7 1.8 1.7 1.5 1.6 1.4 1.4 1.9 2.4 3.4 4.0 4.0 4.6 3.9 3.6 3.6 4.1 3.6 3.1 2.8 2.7 2.8 2.7 2.8 3.0 2.5 2.0 1.8 1.6 1.7 3.3 4.6 4.8
3.8 4.5 4.3 4.4 4.4 4.3 3.8 2.4 2.2 2.1 3.2 3.9 4.6 4.7 4.2 4.5 4.8 4.8 4.2 4.2 3.9 3.3 4.4 4.0 3.6 4.1 4.1 4.2 3.7 3.4 3.0 2.3 2.0 3.9 4.1 4.0
6.3 6.0 5.7 5.4 4.8 5.1 5.4 5.1 4.1 5.1 6.1 6.7 6.4 5.5 5.0 5.5 5.6 6.2 6.1 5.6 5.9 5.5 6.3 5.4 6.1 6.9 6.5 5.5 4.8 4.8 4.7 4.0 4.6 6.1 6.3 6.2
7.6 6.7 6.7 5.7 5.2 4.2 4.5 7.0 7.7 8.9 8.6 7.7 6.7 5.1 5.1 5.5 4.7 5.8 6.2 6.0 6.2 6.3 7.0 7.1 7.0 7.6 8.0 8.2 7.9 6.8 6.6 6.5 7.0 8.4 8.7 7.8
4.6 5.2 5.4 5.4 5.9 6.2 7.0 8.1 5.3 3.2 3.3 6.7 5.9 4.7 3.2 3.7 4.9 5.4 6.6 4.0 3.8 4.3 7.0 5.8 4.4 5.9 5.5 5.1 6.2 6.2 4.5 6.2 5.1 3.4 3.0 4.7
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8.1 7.6 6.7 5.8 6.8 7.4 5.5 5.1 6.6 5.3 9.1 8.4 6.5 7.7 7.3 7.1 9.0 8.6 9.4 8.9 9.5 7.7 2.7 4.4 4.7 5.8 8.7 9.0 6.0 7.2 6.3 7.6 8.6 9.4 9.4 8.9
6.1 5.9 4.0 5.1 4.2 4.0 5.4 7.4 8.5 7.9 10.2 11.1 10.3 10.0 9.3 7.0 5.4 4.8 8.6 10.3 10.9 8.0 4.8 6.9 9.5 9.3 10.1 9.5 9.5 9.0 8.1 9.0 10.0 12.5 10.8 8.8
6.0 5.9 7.4 5.4 3.7 2.7 1.6 4.2 3.7 2.4 6.6 10.6 9.5 7.4 4.6 2.8 .9 1.1 3.1 9.9 7.6 7.9 8.0 7.9 7.1 8.5 8.7 7.8 7.7 6.2 5.1 5.3 4.7 8.6 7.5 6.6
3.7 5.0 6.5 9.1 10.3 7.2 5.7 3.0 2.9 1.5 1.8 8.1 7.9 4.6 4.4 2.9 1.8 1.6 1.4 5.1 4.1 2.9 5.3 5.0 5.4 4.5 4.8 4.4 4.1 6.0 5.9 4.1 2.8 3.6 5.3 4.3
6.1 6.9 6.2 7.9 9.7 8.9 7.3 6.0 5.9 5.2 4.9 6.6 11.4 8.8 7.1 6.5 6.1 5.2 3.5 4.0 5.5 6.3 4.9 4.7 5.4 7.4 5.4 4.0 4.9 5.3 5.9 4.0 4.2 5.0 5.2 5.2
5.4 5.6 5.5 5.0 4.5 6.5 5.9 5.3 5.7 5.0 5.2 6.3 6.5 6.3 6.1 6.7 5.2 5.6 5.6 5.7 5.4 6.0 6.3 5.6 5.3 5.5 5.7 4.9 5.1 5.6 5.2 5.1 4.4 3.8 4.9 5.9
4.8 4.4 4.7 4.4 4.1 4.0 4.2 3.9 3.7 3.5 4.0 4.0 3.9 3.7 4.3 3.7 3.0 3.3 3.6 4.3 4.2 4.6 4.6 4.5 4.4 4.5 3.9 4.2 4.6 4.7 4.5 4.1 3.9 3.5 3.9 4.2
3.4 3.5 3.9 3.5 2.9 2.6 2.8 3.0 3.1 3.2 3.1 3.4 3.0 2.3 2.2 2.6 2.4 2.2 2.3 2.3 2.3 2.7 3.0 3.1 2.6 3.0 2.9 3.1 3.5 3.1 3.7 4.1 3.9 3.4 3.3 3.2
2.5 2.3 2.9 3.9 3.9 3.7 3.9 3.8 3.7 3.2 3.2 2.7 1.8 1.9 2.4 3.0 3.2 2.3 2.0 1.7 1.5 1.4 .9 .6 1.0 1.6 1.2 1.1 1.1 1.0 1.0 1.0 1.6 2.0 2.4 2.3
2.2 2.5 2.9 3.0 3.1 3.2 2.9 2.5 2.3 2.1 1.9 2.0 1.9 1.8 1.8 1.9 1.6 1.2 1.0 1.0 .9 .8 .7 .6 .6 .6 .6 .6 .5 .5 .6 .7 .8 1.3 2.0 2.1

Figure 52. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2002
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations

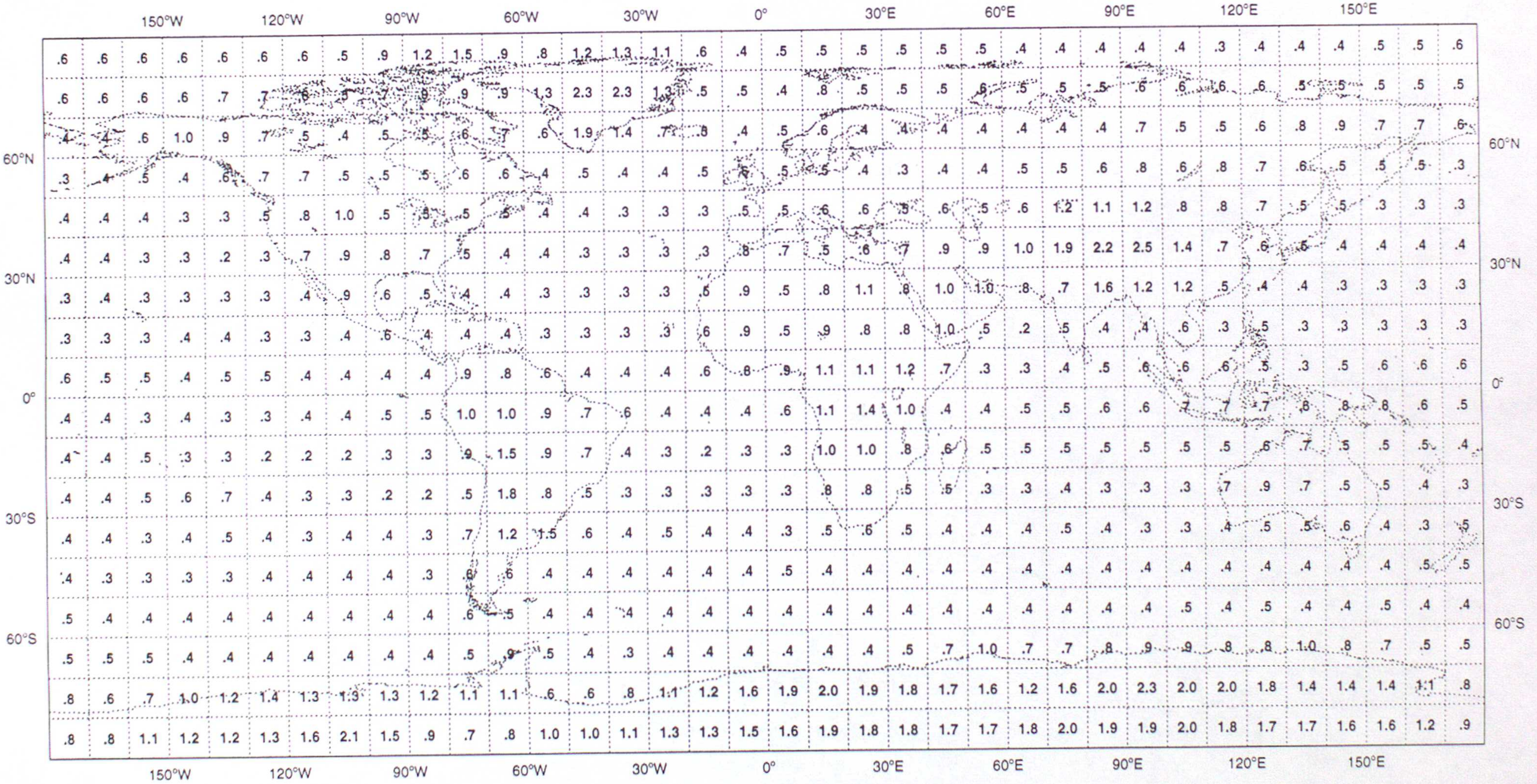
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
.6 .6 .6 .6 .6 .6 .6 .5 .9 1.2 1.5 .9 .8 1.2 1.3 1.1 .6 .4 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .3 .4 .4 .4 .5 .5 .6
.6 .6 .6 .6 .7 .7 .6 .5 .7 .9 .9 .9 1.3 2.3 2.3 1.3 .5 .5 .4 .8 .5 .5 .5 .6 .5 .5 .5 .6 .6 .6 .6 .5 .5 .5 .5 .5
.4 .4 .6 1.0 .9 .7 .5 .4 .5 .5 .6 .7 .6 1.9 1.4 .7 .8 .4 .5 .6 .4 .4 .4 .4 .4 .4 .4 .7 .5 .5 .6 .8 .9 .7 .7 .6
.3 .4 .5 .4 .6 .7 .7 .5 .5 .5 .6 .6 .4 .5 .4 .4 .5 .6 .5 .5 .4 .3 .4 .4 .5 .5 .6 .8 .6 .8 .7 .6 .5 .5 .5 .3
.4 .4 .4 .3 .3 .5 .8 1.0 .5 .5 .5 .5 .4 .4 .3 .3 .3 .5 .5 .6 .6 .5 .6 .5 .6 1.2 1.1 1.2 .8 .8 .7 .5 .5 .3 .3 .3
.4 .4 .3 .3 .2 .3 .7 .9 .8 .7 .5 .4 .4 .3 .3 .3 .3 .8 .7 .5 .6 .7 .9 .9 1.0 1.9 2.2 2.5 1.4 .7 .6 .5 .4 .4 .4 .4
.3 .4 .3 .3 .3 .3 .4 .9 .6 .5 .4 .4 .3 .3 .3 .3 .5 .9 .5 .8 1.1 .8 1.0 1.0 .8 .7 1.6 1.2 1.2 .5 .4 .4 .3 .3 .3 .3
.3 .3 .3 .4 .4 .3 .3 .4 .6 .4 .4 .4 .3 .3 .3 .3 .6 .9 .5 .9 .8 .8 1.0 .5 .2 .5 .4 .4 .6 .3 .5 .3 .3 .3 .3 .3
.6 .5 .5 .4 .5 .5 .4 .4 .4 .4 .9 .8 .6 .4 .4 .4 .6 .8 .9 1.1 1.1 1.2 .7 .3 .3 .4 .5 .6 .6 .6 .5 .3 .5 .6 .6 .6
.4 .4 .3 .4 .3 .3 .4 .4 .5 .5 1.0 1.0 .9 .7 .6 .4 .4 .4 .6 1.1 1.4 1.0 .4 .4 .5 .5 .6 .6 .7 .7 .7 .8 .8 .8 .6 .5
.4 .4 .5 .3 .3 .2 .2 .2 .3 .3 .9 1.5 .9 .7 .4 .3 .2 .3 .3 1.0 1.0 .8 .6 .5 .5 .5 .5 .5 .5 .5 .6 .7 .5 .5 .5 .4
.4 .4 .5 .6 .7 .4 .3 .3 .2 .2 .5 1.8 .8 .5 .3 .3 .3 .3 .3 .8 .8 .5 .5 .3 .3 .4 .3 .3 .3 .7 .9 .7 .5 .5 .4 .3
.4 .4 .3 .4 .5 .4 .3 .4 .4 .3 .7 1.2 1.5 .6 .4 .5 .4 .4 .3 .5 .6 .5 .4 .4 .4 .5 .4 .3 .3 .4 .5 .5 .6 .4 .3 .5
.4 .3 .3 .3 .3 .4 .4 .4 .4 .3 .6 .6 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5
.5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .6 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .5 .4 .4 .5 .4 .4
.5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .5 .9 .5 .4 .3 .4 .4 .4 .4 .4 .4 .5 .7 1.0 .7 .7 .8 .9 .9 .8 .8 1.0 .8 .7 .5 .5
.8 .6 .7 1.0 1.2 1.4 1.3 1.3 1.3 1.2 1.1 1.1 .6 .6 .8 1.1 1.2 1.6 1.9 2.0 1.9 1.8 1.7 1.6 1.2 1.6 2.0 2.3 2.0 2.0 1.8 1.4 1.4 1.4 1.1 .8
.8 .8 1.1 1.2 1.2 1.3 1.6 2.1 1.5 .9 .7 .8 1.0 1.0 1.1 1.3 1.3 1.5 1.6 1.9 1.8 1.8 1.7 1.7 1.8 2.0 1.9 1.9 2.0 1.8 1.7 1.7 1.6 1.6 1.2 .9

Figure 53. ATOVS MEAN O-B brightness temperature differences (deg C). MARCH 2002
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

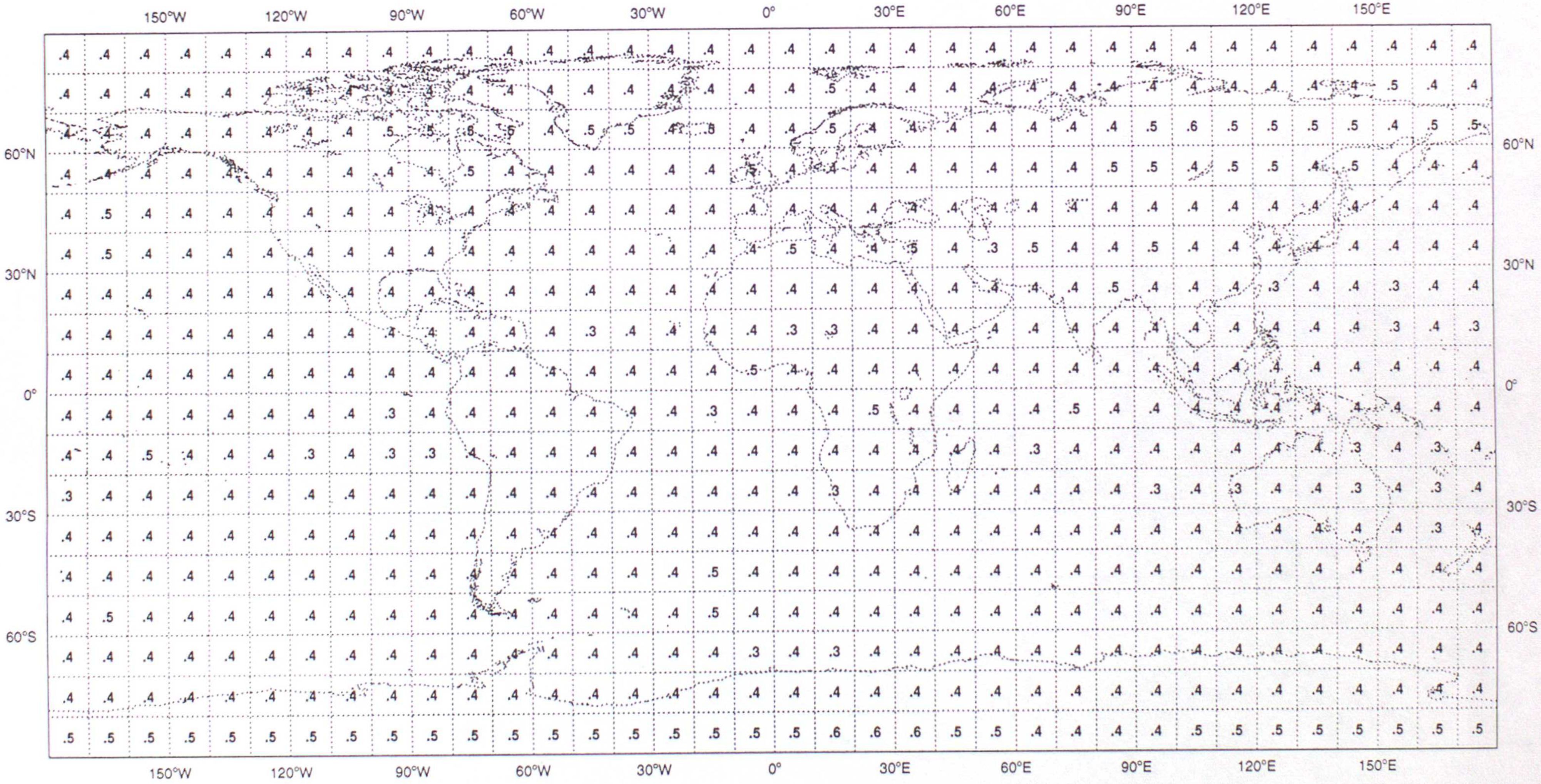
150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 54. ATOVS SD O-B brightness temperature differences (deg C). MARCH 2002
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

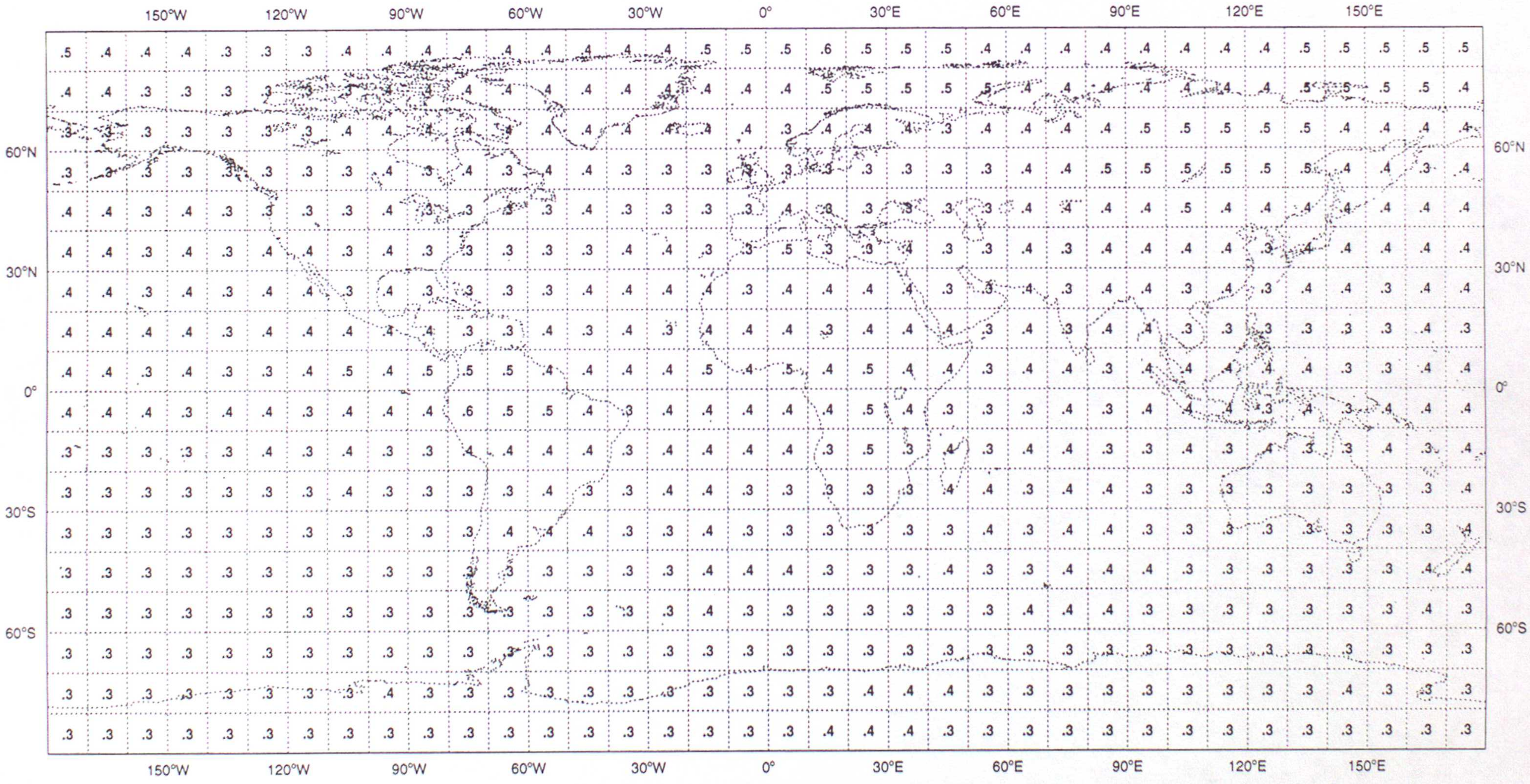
150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: March 2002

Monitoring procedures
Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoy.

Area monitored :10°N - 80°N, 85°W - 0°W

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :All hours combined.

Elements monitored :Mean sea-level pressure (hPa)
:Wind speed ($m\ s^{-1}$)
:Wind direction (degrees)

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. A positive bias indicates the wind observation is veered to the background

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors

GROSS ERROR LIMITS :15 hPa (pressure)
:25 $m\ s^{-1}$ (Vector Wind)

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 $m\ s^{-1}$

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
105018	19.9	-83.9	ALL	P	SUR	1	0	0	0.0	-1.3	1.3
13503	24.9	-25.1	ALL	P	SUR	81	0	0	0.7	0.2	0.7
41501	12.0	-54.6	ALL	P	SUR	123	0	0	2.3	1.1	2.6
41523	29.3	-44.2	ALL	P	SUR	378	0	0	1.2	0.6	1.3
41552	19.9	-51.3	ALL	P	SUR	609	0	0	0.5	-1.0	1.1
41554	22.5	-70.3	ALL	P	SUR	648	0	0	0.5	-0.6	0.8
41556	15.9	-70.6	ALL	P	SUR	627	0	0	0.5	-0.5	0.7
41557	19.4	-67.7	ALL	P	SUR	636	0	0	0.4	-0.3	0.5
41559	20.6	-65.3	ALL	P	SUR	619	0	0	0.4	-0.5	0.7
41560	17.3	-58.6	ALL	P	SUR	625	0	0	0.5	-0.6	0.7
41561	19.7	-55.4	ALL	P	SUR	603	0	0	0.5	-0.6	0.8
41563	18.8	-47.8	ALL	P	SUR	606	0	0	0.5	-0.5	0.7
41625	16.8	-46.2	ALL	P	SUR	83	36	43	3.9	1.9	4.4
41645	29.9	-77.9	ALL	P	SUR	637	0	0	0.6	0.4	0.7
41647	26.9	-71.2	ALL	P	SUR	609	0	0	0.5	-0.2	0.5
41648	25.6	-72.7	ALL	P	SUR	631	0	0	0.5	0.2	0.6
41650	25.9	-68.3	ALL	P	SUR	606	0	0	0.5	0.4	0.7
41651	24.3	-75.4	ALL	P	SUR	641	0	0	0.5	0.3	0.6
41652	28.7	-62.3	ALL	P	SUR	599	0	0	0.7	-0.1	0.7
41656	32.0	-80.5	ALL	P	SUR	632	1	0	1.2	0.5	1.3
41657	42.8	-39.2	ALL	P	SUR	471	1	0	1.4	-0.2	1.5
41658	39.5	-41.6	ALL	P	SUR	624	4	1	1.0	-0.5	1.1
41659	41.3	-44.1	ALL	P	SUR	669	3	0	1.2	0.9	1.5
42533	26.8	-82.4	ALL	P	SUR	631	0	0	0.5	-0.4	0.6
44513	38.6	-68.9	ALL	P	SUR	226	158	70	7.9	-4.7	9.2
44514	40.1	-60.4	ALL	P	SUR	257	62	24	8.6	-3.9	9.5
44515	40.7	-62.8	ALL	P	SUR	236	171	72	5.8	-6.9	9.0
44516	40.1	-59.6	ALL	P	SUR	265	83	31	8.6	-2.1	8.9
44517	38.5	-71.7	ALL	P	SUR	381	52	14	5.4	1.5	5.6
44549	53.2	-25.7	ALL	P	SUR	1103	0	0	1.5	0.7	1.7
44550	50.8	-25.5	ALL	P	SUR	1107	0	0	1.2	0.2	1.2
44551	46.4	-53.5	ALL	P	SUR	1	0	0	0.0	0.6	0.6
44612	27.8	-33.9	ALL	P	SUR	726	0	0	0.5	-0.2	0.5
44616	45.6	-20.3	ALL	P	SUR	887	29	3	3.3	0.2	3.3
44621	61.5	-29.4	ALL	P	SUR	1922	0	0	1.1	0.6	1.3
44623	31.7	-22.9	ALL	P	SUR	882	1	0	0.7	0.4	0.8
44624	45.2	-27.8	ALL	P	SUR	745	0	0	0.7	0.2	0.8
44625	44.5	-29.9	ALL	P	SUR	745	0	0	0.8	0.0	0.8
44627	43.5	-30.4	ALL	P	SUR	637	3	0	1.3	-0.2	1.3
44681	63.0	-29.9	ALL	P	SUR	1	0	0	0.0	2.8	2.8
44721	34.0	-30.1	ALL	P	SUR	714	0	0	1.0	0.5	1.1
44723	46.6	-39.8	ALL	P	SUR	824	3	0	1.5	0.5	1.6
44726	61.2	-28.6	ALL	P	SUR	1663	1	0	1.1	0.3	1.1
44728	51.2	-39.2	ALL	P	SUR	1199	9	1	1.7	0.0	1.7
44729	39.3	-16.0	ALL	P	SUR	591	0	0	0.8	0.9	1.2
44730	54.1	-26.8	ALL	P	SUR	1214	2	0	2.0	0.4	2.1
44737	41.8	-60.9	ALL	P	SUR	1	0	0	0.0	-0.9	0.9
44742	56.8	-19.9	ALL	P	SUR	1245	0	0	1.0	0.2	1.0
44743	60.2	-30.1	ALL	P	SUR	1108	12	1	1.8	-0.4	1.8
44763	45.9	-45.1	ALL	P	SUR	1033	8	1	1.3	0.2	1.3
44764	51.1	-42.7	ALL	P	SUR	719	0	0	1.5	0.0	1.5
44766	42.1	-49.5	ALL	P	SUR	279	0	0	1.1	-0.1	1.1
44775	30.2	-37.7	ALL	P	SUR	739	0	0	0.5	-0.4	0.6
44778	46.8	-12.5	ALL	P	SUR	1015	0	0	0.8	0.1	0.8
44779	54.1	-36.6	ALL	P	SUR	628	6	1	1.9	-0.7	2.0
44780	54.7	-43.8	ALL	P	SUR	210	0	0	0.9	-0.4	0.9
44811	41.1	-66.6	ALL	P	SUR	1	0	0	0.0	-0.6	0.6
44879	54.1	-34.3	ALL	P	SUR	1	0	0	0.0	1.4	1.4
45739	43.4	-79.4	ALL	P	SUR	1	0	0	0.0	0.6	0.6
45808	44.3	-81.4	ALL	P	SUR	1	0	0	0.0	2.4	2.4

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
47556	64.8	-62.6	ALL	P	SUR	437	0	0	1.4	0.5	1.4
52697	50.9	-26.0	ALL	P	SUR	1	0	0	0.0	-1.0	1.0
62501	32.2	-26.6	ALL	P	SUR	705	0	0	0.6	0.5	0.7
62503	32.5	-18.7	ALL	P	SUR	736	0	0	0.6	-0.4	0.7
62504	38.1	-18.1	ALL	P	SUR	692	0	0	0.7	0.3	0.8
62512	43.3	-16.6	ALL	P	SUR	899	1	0	1.1	-0.3	1.2
62516	47.9	-10.9	ALL	P	SUR	924	2	0	0.8	-0.1	0.8
62518	38.1	-14.4	ALL	P	SUR	1214	0	0	0.6	-0.1	0.6
62520	60.0	-13.3	ALL	P	SUR	565	0	0	1.1	-0.1	1.1
62598	59.2	-13.8	ALL	P	SUR	780	5	1	1.4	-0.4	1.5
62607	50.1	-6.1	ALL	P	SUR	1	0	0	0.0	-1.8	1.8
62692	50.0	-26.1	ALL	P	SUR	1	0	0	0.0	-0.1	0.1
62694	54.0	-24.9	ALL	P	SUR	1159	7	1	1.6	0.3	1.6
62695	55.9	-8.2	ALL	P	SUR	415	0	0	0.9	0.3	1.0
62696	52.5	-22.7	ALL	P	SUR	1138	2	0	1.4	-0.3	1.5
62697	50.6	-25.6	ALL	P	SUR	1124	2	0	1.4	-0.2	1.4
62706	57.0	-9.9	ALL	P	SUR	1	0	0	0.0	-1.0	1.0
62801	45.2	-5.0	ALL	P	SUR	1	0	0	0.0	-0.7	0.7
62803	49.9	-2.9	ALL	P	SUR	1	0	0	0.0	-0.2	0.2
62807	50.1	-6.1	ALL	P	SUR	1	0	0	0.0	-0.3	0.3
62808	53.5	-19.5	ALL	P	SUR	1	0	0	0.0	-0.2	0.2
62852	48.5	-5.6	ALL	P	SUR	1	0	0	0.0	0.0	0.0
62881	51.0	-13.3	ALL	P	SUR	1	0	0	0.0	-0.3	0.3
62890	53.1	-81.2	ALL	P	SUR	1	0	0	0.0	-11.9	11.9
63661	72.0	-17.6	ALL	P	SUR	235	2	1	1.7	0.3	1.7
63663	76.2	-15.6	ALL	P	SUR	522	2	0	1.0	0.0	1.0
64549	54.5	-35.1	ALL	P	SUR	586	12	2	1.8	-0.6	1.9
64552	63.3	-30.6	ALL	P	SUR	1275	3	0	1.3	0.0	1.3
64553	58.4	-35.3	ALL	P	SUR	408	0	0	0.8	-0.4	0.9
65595	61.1	-15.4	ALL	P	SUR	864	9	1	4.1	2.0	4.6
68598	59.0	-10.8	ALL	P	SUR	1	0	0	0.0	-0.4	0.4
WIND SPEED											
105018	19.9	-83.9	ALL	SPEED	SUR	1	0	0	0.0	6.4	6.4
41523	29.3	-44.2	ALL	SPEED	SUR	363	18	5	7.3	4.0	8.4
41552	19.9	-51.3	ALL	SPEED	SUR	596	0	0	1.6	-0.7	1.8
41554	22.5	-70.3	ALL	SPEED	SUR	637	0	0	3.3	-2.7	4.3
41556	15.9	-70.6	ALL	SPEED	SUR	619	0	0	1.6	1.4	2.1
41557	19.4	-67.7	ALL	SPEED	SUR	630	2	0	1.8	0.4	1.8
41559	20.6	-65.3	ALL	SPEED	SUR	613	2	0	1.8	1.0	2.0
41560	17.3	-58.6	ALL	SPEED	SUR	627	0	0	2.0	0.5	2.0
41561	19.7	-55.4	ALL	SPEED	SUR	598	0	0	1.9	-0.2	1.9
41563	18.8	-47.8	ALL	SPEED	SUR	600	0	0	1.6	0.1	1.6
41625	16.8	-46.2	ALL	SPEED	SUR	5	0	0	0.0	10.0	10.0
41645	29.9	-77.9	ALL	SPEED	SUR	630	3	0	2.5	1.1	2.7
41647	26.9	-71.2	ALL	SPEED	SUR	604	1	0	2.4	1.8	3.0
41648	25.6	-72.7	ALL	SPEED	SUR	630	4	1	2.5	0.7	2.6
41652	28.7	-62.3	ALL	SPEED	SUR	592	1	0	2.3	1.0	2.6
42533	26.8	-82.4	ALL	SPEED	SUR	628	9	1	3.8	2.9	4.8
44551	46.4	-53.5	ALL	SPEED	SUR	1	0	0	0.0	0.7	0.7
44625	44.5	-29.9	ALL	SPEED	SUR	1	0	0	0.0	-2.5	2.5
44723	46.6	-39.8	ALL	SPEED	SUR	1	0	0	0.0	-7.3	7.3
44742	56.8	-19.9	ALL	SPEED	SUR	1	0	0	0.0	-2.2	2.2
44811	41.1	-66.6	ALL	SPEED	SUR	1	0	0	0.0	0.6	0.6
62520	60.0	-13.3	ALL	SPEED	SUR	561	1	0	3.1	-0.4	3.1
62607	50.1	-6.1	ALL	SPEED	SUR	1	0	0	0.0	-0.2	0.2
62801	45.2	-5.0	ALL	SPEED	SUR	2	0	0	2.0	-1.8	2.7
62803	49.9	-2.9	ALL	SPEED	SUR	1	0	0	0.0	0.1	0.1

```
IDENTIFIER  LAT.   LONG.   HOUR   ELEM    LEVEL NOBS   NGE   PGE     SD    BIAS    RMS

WIND DIRECTION

62807        50.1    -6.1  ALL    SPEED   SUR      1     0     0    0.0    -3.6    3.6
62808        53.5   -19.5  ALL    SPEED   SUR      1     0     0    0.0    -2.0    2.0
62852        48.5    -5.6  ALL    SPEED   SUR      1     0     0    0.0     1.4    1.4
62863        47.5    -8.4  ALL    SPEED   SUR      1     0     0    0.0    -0.8    0.8
62881        51.0   -13.3  ALL    SPEED   SUR      1     0     0    0.0    -0.1    0.1

105018       19.9   -83.9  ALL    DIRN.   SUR      1     0     0    0.0   -11.8   11.8
41523        29.3   -44.2  ALL    DIRN.   SUR    286    18     6   37.2    -8.7   38.2
41552        19.9   -51.3  ALL    DIRN.   SUR    473     0     0   17.8    -2.5   18.0
41554        22.5   -70.3  ALL    DIRN.   SUR    210     0     0   18.0     9.0   20.1
41556        15.9   -70.6  ALL    DIRN.   SUR    567     0     0   13.8     3.9   14.3

41557        19.4   -67.7  ALL    DIRN.   SUR    524     2     0   10.7    -9.3   14.2
41559        20.6   -65.3  ALL    DIRN.   SUR    534     2     0   18.9     1.1   19.0
41560        17.3   -58.6  ALL    DIRN.   SUR    556     0     0   13.6    15.6   20.7
41561        19.7   -55.4  ALL    DIRN.   SUR    493     0     0   13.2    -8.5   15.7
41563        18.8   -47.8  ALL    DIRN.   SUR    417     0     0   13.1    -7.9   15.3

41625        16.8   -46.2  ALL    DIRN.   SUR      5     0     0    0.3     9.6    9.6
41645        29.9   -77.9  ALL    DIRN.   SUR    375     3     1   21.3    10.4   23.7
41647        26.9   -71.2  ALL    DIRN.   SUR    365     1     0   18.7    -5.3   19.4
41648        25.6   -72.7  ALL    DIRN.   SUR    374     4     1   25.1    24.6   35.1
41652        28.7   -62.3  ALL    DIRN.   SUR    391     1     0   18.2    -6.5   19.3

42533        26.8   -82.4  ALL    DIRN.   SUR    392     9     2   33.1    -6.2   33.7
44551        46.4   -53.5  ALL    DIRN.   SUR      1     0     0    0.0     4.8    4.8
44625        44.5   -29.9  ALL    DIRN.   SUR      1     0     0    0.0   137.0  137.0
44742        56.8   -19.9  ALL    DIRN.   SUR      1     0     0    0.0   -29.0   29.0
44811        41.1   -66.6  ALL    DIRN.   SUR      1     0     0    0.0    -5.9    5.9

62520        60.0   -13.3  ALL    DIRN.   SUR    515     1     0   16.7     5.9   17.7
62607        50.1    -6.1  ALL    DIRN.   SUR      1     0     0    0.0    -8.3    8.3
62801        45.2    -5.0  ALL    DIRN.   SUR      2     0     0    1.7    -1.9    2.5
62803        49.9    -2.9  ALL    DIRN.   SUR      1     0     0    0.0    27.3   27.3
62807        50.1    -6.1  ALL    DIRN.   SUR      1     0     0    0.0     2.9    2.9

62852        48.5    -5.6  ALL    DIRN.   SUR      1     0     0    0.0    -2.2    2.2
62881        51.0   -13.3  ALL    DIRN.   SUR      1     0     0    0.0    -3.8    3.8
```

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: March 2002

Monitoring procedures:
Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :40°N - 70°N, 60°W - 0°W.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in $m\ s^{-1}$

Parameters monitored :N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.

GROSS ERROR LIMITS :10.0 °C ; 60 $m\ s^{-1}$ Vector Wind

SELECTION CRITERIA :N REP ≥ 20

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	864	4	9	2.2	0.2	820	0	5	0	8.5	0.6
ACA	1121	0	2	1.5	-0.1	1127	0	3	0	6.3	0.9
AEA	209	0	0	1.6	0.0	142	0	2	0	7.5	0.9
AEL	441	1	13	1.8	-1.0	393	2	16	0	[illegible]	[illegible]
AEY	115	1	11	1.9	0.8	103	1	12	0	7.9	[illegible]
AFL	366	0	2	1.5	0.4	361	0	4	0	7.1	0.4
AFR	911	0	10	1.7	0.1	845	1	10	0	[illegible]	0.5
AIH	234	1	6	2.0	-0.1	231	0	6	0	[illegible]	0.9
AIS	25	0	8	1.4	-0.3	26	0	4	0	[illegible]	1.6
AJM	186	0	5	1.8	-0.4	161	0	4	0	7.4	0.1
AMM	58	3	7	1.2	0.3	52	0	81	0	5.9	-0.8
AMX	241	2	4	2.0	-0.1	217	0	6	0	9.5	[illegible]
AZA	420	1	5	1.9	0.1	415	0	1	0	[illegible]	[illegible]
BAL	157	4	20	1.7	-0.3	144	1	19	0	8.4	1.5
BAW	583	1	9	1.7	-0.7	577	0	[illegible]	0	6.5	[illegible]
BSK	23	0	9	2.6	0.4	25	0	4	0	11.4	2.1
BWA	55	2	7	2.1	1.6	45	2	4	0	5.7	1.4
CFG	437	0	4	1.6	-0.8	414	1	4	0	7.0	[illegible]
CLX	264	1	2	1.5	-0.3	269	0	[illegible]	0	5.8	0.4
COA	120	0	11	1.8	-0.6	104	0	[illegible]	0	8.0	1.8
CRL	389	1	4	1.5	0.2	352	0	4	0	8.1	0.7
CUB	100	2	10	2.5	1.1	85	0	8	0	10.9	[illegible]
DAF	22	0	0	1.2	0.1	21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DAL	904	0	17	1.7	-0.7	[illegible]	0	[illegible]	[illegible]	[illegible]	[illegible]
DCE	79	0	8	1.2	-0.2	[illegible]	0	[illegible]	[illegible]	[illegible]	[illegible]
DCS	22	0	5	2.6	-0.2	21	[illegible]	[illegible]	0	5.6	[illegible]
DLH	844	1	10	1.4	0.1	[illegible]	[illegible]	[illegible]	0	7.1	[illegible]
EDW	64	0	0	1.6	-0.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EEZ	82	0	11	1.7	0.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EIA	135	0	4	1.8	-0.4	[illegible]	1	100	[illegible]	[illegible]	6.3
ELY	126	1	8	1.4	-0.3	[illegible]	0	9	0	8.1	0.5
ETH	30	0	10	1.3	-0.2	31	3	13	0	5.4	1.0
EWW	71	0	1	1.4	0.2	77	1	3	0	8.5	1.1
FDX	780	0	34	1.6	0.1	[illegible]	1	35	0	7.6	1.3
FIN	249	0	3	1.4	0.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GAF	22	0	0	1.4	-0.6	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]
GCO	102	0	2	1.5	-0.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GRL	33	0	0	1.3	-0.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GTI	242	1	7	1.7	-0.3	[illegible]	0	7	0	[illegible]	[illegible]
IBE	1069	0	7	1.8	0.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
ICE	879	0	2	1.4	0.0	857	0	2	0	5.7	[illegible]
KLM	998	0	5	1.6	0.0	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]
LDA	58	0	10	0.9	-0.3	[illegible]	0	[illegible]	[illegible]	[illegible]	[illegible]
LDI	373	0	100	2.1	-0.3	[illegible]	0	[illegible]	0	[illegible]	[illegible]
LIB	383	1	13	1.8	0.7	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]
LOT	141	1	4	2.0	-0.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
LTU	445	0	6	1.3	-0.3	396	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MON	69	1	3	1.4	-0.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MPD	101	0	1	1.8	-0.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MPH	410	0	2	1.9	-0.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NCA	30	3	3	2.1	-0.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NWA	3084	0	2	1.6	0.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
OAE	26	0	15	1.7	-0.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PAC	137	1	9	2.3	-0.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
RAM	44	0	5	2.0	-1.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
RCH	314	2	100	1.9	0.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
RJA	23	0	4	1.8	-0.2	[illegible]	[illegible]	4	[illegible]	[illegible]	[illegible]
RRR	63	5	16	2.1	-0.9	[illegible]	2	15	0	[illegible]	[illegible]
RZO	73	1	64	4.2	2.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
SLR	145	0	10	1.6	-0.3	138	1	12	0	7.6	0.7
SVA	36	3	11	1.5	0.2	42	0	10	0	8.3	0.6
TAP	291	0	2	1.4	-0.2	216	0	4	0	7.3	0.5
TPA	29	0	0	1.3	0.2	28	0	0	0	5.0	0.1
TSC	34	6	9	1.9	-0.2	31	0	3	0	8.8	-0.3
UAL	285	1	91	2.2	-1.4	293	0	91	0	7.5	0.6
UPS	1222	0	40	1.8	0.1	1208	0	40	0	7.5	0.3
USA	142	1	4	1.6	0.0	123	1	4	0	8.0	1.0
VIR	388	0	4	1.7	0.1	383	0	5	0	7.7	1.0
WOA	117	0	11	1.7	0.4	115	0	15	0	9.3	1.5
EU	24059	0	27	1.3	0.1	24059	0	26	0	4.6	0.4
KL	1166	0	14	1.3	0.7	1166	0	14	0	5.0	1.0
SA	26	4	100	2.7	2.2	26	0	4	0	5.5	1.6
TN	26	0	8	1.7	0.3	27	4	15	0	9.3	0.1
N	418	1	5	2.2	0.5	427	0	4	0	6.9	1.0
US ACARS	47020	5	49	1.3	0.0	47020	0	43	0	5.0	0.6

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: March 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
GROSS ERROR LIMITS	:Defined in Appendix I.1	

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DASAP2	12	Z	100	3	0	3.1	29.5	29.3
ELML7	00	Z	100	19	0	9.0	23.2	21.3
ELML7	12	Z	100	17	0	12.6	35.5	33.2
FNOR	00	Z	100	3	0	17.7	30.1	24.3
FNOR	12	Z	100	6	0	4.7	39.0	38.7
FNOU	00	Z	100	9	0	5.2	41.0	40.7
FNOU	12	Z	100	9	0	8.8	31.5	30.2
FNPH	00	Z	100	10	0	30.5	52.9	43.2
FNPH	12	Z	100	7	0	24.0	35.1	25.6
FNRS	00	Z	100	12	0	22.9	25.8	12.0
FNRS	12	Z	100	15	0	14.4	20.6	14.7
LDWR	00	Z	100	30	0	13.6	14.2	-4.0
LDWR	12	Z	100	29	0	11.6	12.6	-4.9
OVYA2	00	Z	100	1	0	0.0	1.0	1.0
OVYA2	12	Z	100	2	0	11.5	11.6	-1.5
OXTS2	00	Z	100	8	0	11.9	13.0	-5.3
OXTS2	12	Z	100	11	0	12.7	17.4	-11.9
SWJS	00	Z	100	3	1	2.1	27.4	27.3
SWJS	12	Z	100	4	0	9.8	27.1	25.3
V2XO	00	Z	100	4	0	29.4	32.8	14.5
V2XO	12	Z	100	5	0	27.7	30.2	12.0
WPKD	00	Z	100	6	1	8.2	12.4	9.3
WPKD	12	Z	100	9	0	13.2	17.2	11.1
ZCBP6	00	Z	100	8	0	16.7	23.2	16.1
ZCBP6	12	Z	100	6	0	25.2	47.0	39.7
03953	00	Z	100	30	0	12.2	25.9	22.8
03953	12	Z	100	30	0	13.9	31.9	28.7
04018	00	Z	100	30	0	10.0	16.1	12.6
04018	12	Z	100	29	0	16.9	19.4	9.5
04220	00	Z	100	30	0	8.3	11.2	-7.5
04220	12	Z	100	27	0	8.8	17.2	-14.7
04270	00	Z	100	27	0	12.2	18.6	-14.1
04270	12	Z	100	28	0	26.9	31.5	-16.5
04339	00	Z	100	30	0	10.2	10.6	2.7
04339	12	Z	100	27	0	7.8	9.3	5.0
04360	00	Z	100	30	0	11.4	11.5	-0.7
04360	12	Z	100	28	0	5.8	8.7	-6.4
08001	00	Z	100	27	1	22.4	22.9	-4.7
08001	12	Z	100	26	1	28.1	28.4	-3.8
08508	12	Z	100	28	0	15.0	33.0	29.4
08522	00	Z	100	30	0	17.8	30.9	25.2
08522	12	Z	100	27	0	9.5	19.5	17.0
08594	12	Z	100	19	0	40.2	61.9	47.1
60020	00	Z	100	29	0	11.9	36.2	34.1
60020	12	Z	100	27	0	12.9	24.2	20.5
71600	00	Z	100	30	0	14.0	16.9	9.5
71600	12	Z	100	30	0	18.3	19.3	6.0
72201	00	Z	100	27	0	22.9	42.5	35.8
72201	12	Z	100	29	0	21.1	46.7	41.7
72402	00	Z	100	30	0	17.2	34.2	29.6
72402	12	Z	100	30	0	15.9	40.9	37.7
74494	00	Z	100	25	0	12.1	19.0	14.7
74494	12	Z	100	26	0	12.7	12.8	2.0
78016	12	Z	100	26	0	15.1	33.7	30.1

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: March 2002

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DASAP2	12	Z	500	5	0	6.3	6.9	2.8
ELML7	00	Z	500	19	0	5.6	6.0	2.4
ELML7	12	Z	500	18	0	9.2	10.0	3.9
FNOR	00	Z	500	7	0	9.3	14.2	10.7
FNOR	12	Z	500	12	0	6.7	14.6	13.0
FNOU	00	Z	500	10	0	7.0	9.7	6.8
FNOU	12	Z	500	11	0	9.0	15.6	12.8
FNPH	00	Z	500	11	0	7.1	14.7	12.8
FNPH	12	Z	500	11	0	9.7	17.2	14.2
FNRS	00	Z	500	15	0	11.5	11.6	-1.6
FNRS	12	Z	500	19	0	17.5	17.7	2.5
LDWR	00	Z	500	30	0	12.1	12.4	3.0
LDWR	12	Z	500	29	0	12.0	12.1	2.0
OVYA2	00	Z	500	1	0	0.0	23.0	-23.0
OVYA2	12	Z	500	2	0	8.0	8.1	-1.0
OXTS2	00	Z	500	8	0	10.4	10.6	2.0
OXTS2	12	Z	500	11	0	8.1	8.1	0.8
SWJS	00	Z	500	3	1	2.6	15.9	15.7
SWJS	12	Z	500	4	0	4.2	15.1	14.5
V2XO	00	Z	500	4	0	16.2	16.2	-0.3
V2XO	12	Z	500	5	0	5.7	15.3	14.2
WPKD	00	Z	500	6	1	13.3	13.4	1.7
WPKD	12	Z	500	10	0	8.8	8.9	1.1
ZCBP6	00	Z	500	8	0	7.7	8.9	4.5
ZCBP6	12	Z	500	7	0	17.8	21.1	11.4
03953	00	Z	500	30	0	5.9	13.0	11.6
03953	12	Z	500	30	0	8.0	16.2	14.2
04018	00	Z	500	30	0	6.6	12.4	10.5
04018	12	Z	500	30	0	10.9	16.5	12.4
04220	00	Z	500	30	0	6.0	6.2	1.4
04220	12	Z	500	27	0	7.3	7.4	1.3
04270	00	Z	500	28	0	9.7	10.5	4.0
04270	12	Z	500	28	0	23.8	24.0	2.3
04339	00	Z	500	30	0	7.4	10.7	7.7
04339	12	Z	500	27	0	7.8	12.3	9.6
04360	00	Z	500	30	0	7.7	8.6	3.9
04360	12	Z	500	28	0	6.5	6.6	1.0
08001	00	Z	500	27	1	12.9	12.9	-1.2
08001	12	Z	500	28	1	16.1	16.1	-0.3
08508	12	Z	500	28	0	10.1	12.9	8.0
08522	00	Z	500	30	0	13.9	14.8	5.0
08522	12	Z	500	30	0	11.3	13.5	7.5
08594	12	Z	500	23	0	9.3	11.3	6.4
60020	00	Z	500	30	0	8.1	15.2	12.8
60020	12	Z	500	29	0	9.6	14.9	11.3
71600	00	Z	500	30	0	8.2	8.4	1.6
71600	12	Z	500	30	0	11.3	11.3	0.6
72201	00	Z	500	29	0	7.0	12.8	10.8
72201	12	Z	500	29	0	7.2	9.8	6.7
72402	00	Z	500	30	0	7.6	10.6	7.4
72402	12	Z	500	30	0	7.8	10.4	7.0
74494	00	Z	500	28	0	7.6	8.3	3.3
74494	12	Z	500	28	0	10.2	10.2	0.4
78016	12	Z	500	27	0	9.1	14.3	11.0

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: March 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :100 hPa.

Element monitored :VECTOR WIND in $m\ s^{-1}$

Parameters monitored :NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DASAP2	12	V	100	3	0	0	2.6	0.5	1.4
ELML7	00	V	100	16	0	0	5.6	2.6	-1.9
ELML7	12	V	100	16	0	0	6.0	0.0	1.3
FNOR	00	V	100	1	0	0	6.0	0.2	-6.0
FNOR	12	V	100	4	0	0	4.9	-2.1	1.3
FNOU	00	V	100	8	0	0	2.9	-0.5	-0.4
FNOU	12	V	100	8	0	0	3.6	0.0	0.2
FNPH	00	V	100	7	0	0	7.4	-2.3	2.6
FNPH	12	V	100	5	0	0	4.9	-2.0	2.2
FNRS	00	V	100	9	0	0	4.6	0.3	-0.2
FNRS	12	V	100	11	0	0	6.1	1.2	0.1
LDWR	00	V	100	30	0	0	3.1	0.5	0.1
LDWR	12	V	100	29	0	0	3.3	0.6	-1.0
OVYA2	12	V	100	2	0	50	14.7	-2.4	-10.2
OXTS2	00	V	100	6	0	0	5.6	-1.7	0.2
OXTS2	12	V	100	11	0	0	4.1	1.6	0.3
SWJS	00	V	100	4	0	0	4.5	1.6	-4.1
SWJS	12	V	100	4	0	0	7.6	3.6	-2.9
V2XO	00	V	100	4	0	0	3.7	-0.9	0.3
V2XO	12	V	100	4	0	0	4.1	-0.7	1.1
WPKD	00	V	100	6	0	0	5.9	-3.6	0.7
WPKD	12	V	100	6	0	0	2.7	1.5	-0.4
ZCBP6	00	V	100	7	0	0	5.0	0.0	-2.9
ZCBP6	12	V	100	5	0	0	4.0	1.4	1.2
03953	00	V	100	30	0	0	2.7	0.4	-0.2
03953	12	V	100	27	0	0	3.8	0.3	0.6
04018	00	V	100	29	0	0	4.3	1.3	-0.3
04018	12	V	100	29	0	0	3.3	1.2	-0.6
04220	00	V	100	30	0	0	3.8	-0.4	1.0
04220	12	V	100	27	0	0	3.1	0.0	1.2
04270	00	V	100	27	0	0	4.5	1.3	1.6
04270	12	V	100	28	0	0	4.8	1.1	-0.1
04339	00	V	100	30	0	0	3.8	-0.2	0.2
04339	12	V	100	27	0	0	4.0	0.8	-0.2
04360	00	V	100	30	0	0	3.2	-0.1	0.7
04360	12	V	100	27	0	7	6.6	-1.1	0.0
08001	00	V	100	27	0	0	3.4	0.0	-1.0
08001	12	V	100	24	0	0	4.0	-0.4	0.3
08508	12	V	100	15	0	0	5.5	-0.9	-0.3
08522	00	V	100	27	0	0	6.1	2.0	1.0
08522	12	V	100	27	0	0	5.3	-0.3	2.1
08594	12	V	100	18	0	100	7.1	-3.6	2.3
60020	00	V	100	29	0	3	7.3	2.1	0.5
60020	12	V	100	26	0	0	6.9	-0.1	3.5
71600	00	V	100	30	0	3	7.4	-0.4	0.3
71600	12	V	100	30	0	3	5.9	0.4	-0.1
72201	00	V	100	27	0	0	4.5	-0.3	0.4
72201	12	V	100	29	0	0	4.3	0.0	-0.2
72402	00	V	100	30	0	0	4.3	0.5	-0.2
72402	12	V	100	29	0	0	4.7	2.2	-0.3
74494	00	V	100	20	0	100	4.6	0.1	0.8
74494	12	V	100	18	0	100	4.8	-0.2	1.7
78016	12	V	100	25	0	0	4.7	0.9	-0.8

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: March 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS:	Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS	:Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DASAP2	12	V	500	5	0	0	2.5	0.6	0.8
ELML7	00	V	500	18	0	0	2.9	0.5	0.3
ELML7	12	V	500	18	0	0	3.5	0.3	0.3
FNOR	00	V	500	5	0	0	3.4	-1.7	0.6
FNOR	12	V	500	10	0	0	4.6	-0.7	1.9
FNOU	00	V	500	9	0	0	3.5	-0.2	-0.4
FNOU	12	V	500	9	0	0	3.1	0.1	0.8
FNPH	00	V	500	8	0	0	3.2	-0.6	-0.1
FNPH	12	V	500	6	0	0	4.9	-0.9	-0.8
FNRS	00	V	500	10	0	0	3.8	0.4	0.7
FNRS	12	V	500	15	0	0	4.2	-0.1	1.0
LDWR	00	V	500	30	0	0	5.3	0.5	0.1
LDWR	12	V	500	29	0	0	3.7	0.0	-0.8
OVYA2	00	V	500	1	0	0	6.4	-3.9	-5.1
OVYA2	12	V	500	2	0	0	10.3	8.7	3.5
OXTS2	00	V	500	8	0	0	3.7	-0.8	1.6
OXTS2	12	V	500	11	0	0	5.2	-0.9	-0.8
SWJS	00	V	500	4	0	0	4.4	1.5	-1.3
SWJS	12	V	500	4	0	0	3.2	0.3	-1.2
V2XO	00	V	500	4	0	0	4.9	-2.0	1.3
V2XO	12	V	500	5	0	0	6.1	0.2	3.1
WPKD	00	V	500	6	0	0	3.6	1.6	-0.2
WPKD	12	V	500	8	0	0	6.3	-2.7	0.5
ZCBP6	00	V	500	4	0	0	4.2	0.3	-1.9
ZCBP6	12	V	500	4	0	0	3.2	-0.7	0.1
03953	00	V	500	29	0	0	4.3	-0.3	-0.8
03953	12	V	500	28	0	0	5.7	2.4	0.1
04018	00	V	500	30	0	0	4.1	0.0	-1.2
04018	12	V	500	30	0	0	5.8	-0.6	0.0
04220	00	V	500	29	0	0	4.8	-0.2	1.2
04220	12	V	500	27	0	0	5.2	0.1	-0.8
04270	00	V	500	28	0	0	5.1	-0.3	0.5
04270	12	V	500	28	0	0	4.6	0.5	0.4
04339	00	V	500	29	0	0	6.0	1.3	0.6
04339	12	V	500	27	0	0	5.4	-0.2	0.5
04360	00	V	500	30	0	0	4.6	0.5	0.1
04360	12	V	500	26	0	0	4.9	0.1	0.2
08001	00	V	500	27	0	0	4.5	-0.1	-0.4
08001	12	V	500	29	0	0	4.4	-0.2	-0.6
08508	12	V	500	17	0	0	6.0	-2.0	-1.6
08522	00	V	500	30	0	0	4.5	-1.1	0.0
08522	12	V	500	30	0	0	5.1	-0.8	1.0
08594	12	V	500	24	0	100	4.9	-0.9	1.0
60020	00	V	500	29	0	0	5.5	0.0	-0.4
60020	12	V	500	29	0	0	3.7	0.7	0.9
71600	00	V	500	30	0	3	7.2	-1.0	0.6
71600	12	V	500	30	0	3	7.9	-0.8	1.6
72201	00	V	500	29	0	0	3.1	-0.4	-0.2
72201	12	V	500	29	0	0	3.5	-0.5	0.6
72402	00	V	500	30	0	0	4.0	0.6	-1.2
72402	12	V	500	29	0	0	3.9	0.4	-0.1
74494	00	V	500	28	0	100	3.8	-1.7	0.3
74494	12	V	500	28	0	100	4.8	-1.6	0.9
78016	12	V	500	27	0	0	4.3	1.8	0.3

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45